

VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a major, municipal permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260 et seq. The discharge results from the operation of a municipal wastewater treatment facility. This permit action includes revised effluent limitations and special conditions, and updates the formatting of portions of the permit.

1. Facility Name and Address: Proctors Creek WWTP
Chesterfield County, Department of Utilities
1200 Coxendale Rd.
Chester, VA 23836
2. SIC Code: 4952 Sewerage Systems
3. Permit No. VA0060194 Permit Expiration Date: June 19, 2010
4. Owner Contact:
Name: Scott Smedley
Title: Plant Manager
Telephone No.: 804/768-7557
Address: 1200 Coxendale Rd., Chester, VA 23836
5. Application Complete Date: December 29, 2009
Permit Drafted By: Virginia R. E. Kelly Date: January 25, 2010; revised February 9, 2010,
May 5, 2010, June 4, 2010, July 19, 2010, July
28, 2010
DEQ Regional Office: Piedmont Regional Office
Reviewed By: Emilee Carpenter Date: January 28, 2010
Curt Linderman Date: May 4, 2010
Central Office Date: June 9, 2010
Kyle Winter Date: June 4, 2010
6. Receiving Stream:

<p>Name: <u>Outfall 001</u> River Mile: 2-JMS097.94 Basin: James River (Lower) Subbasin: N/A Section: 1 Class: II Special Standards: bb</p> <p>1-Day, 10-Year Low Flow: 446 MGD*</p> <p>7-Day, 10-Year Low Flow: 501 MGD*</p> <p>30-Day, 5-Year Low Flow: 712 MGD*</p> <p>30-Day, 10-Year Low Flow: 641 MGD*</p> <p>Harmonic Mean Flow: 2109 MGD*</p> <p>Tidal? Yes</p> <p>On 303(d) list? Yes</p>	
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* Fresh water flows at fall line. These flows are presented for information only. Pollutant loading mixing analyses are based on tidal default mixing ratios as discussed in #17 below.

7. Operator License Requirements: The recommended attendance hours by a licensed operator and the minimum daily hours that the treatment works should be manned by operating staff are contained in the Sewage Collection and Treatment Regulations (SCAT) 9 VAC 25-790 et seq. A Class I licensed operator is required for the facility.
8. Reliability Class: Reliability is a measurement of the ability of a component or system to perform its designated function without failure or interruption of service. The reliability classification is based on the water quality and public health consequences of a component or system failure. The permittee is required to maintain Class I Reliability for the existing facility.
9. Permit Characterization:

<input checked="" type="checkbox"/> Existing Discharge	<input checked="" type="checkbox"/> Municipal
<input checked="" type="checkbox"/> POTW	SIC Code(s): 4952
<input checked="" type="checkbox"/> Reissuance	<input checked="" type="checkbox"/> Discharge to 303(d) Listed Segment
<input checked="" type="checkbox"/> Water Quality Limited	<input checked="" type="checkbox"/> Whole Effluent Toxicity Program Required
10. Wastewater Flow and Treatment: Table 1

Outfall Number	Wastewater Source	Treatment	Flow
001	Chesterfield County (and 29 Industrial contributors)	Screening, comminution, aerated grit removal, primary clarification, biological nutrient removal, secondary clarification, tertiary gravity filters, chlorination, dechlorination, re-aeration via step cascade; for sludge: dissolved air floatation, anaerobic digestion, gravity thickening, and land application	27.0 MGD design capacity

See **Attachment A** for a facility diagram.

11. Sludge Disposal: Chesterfield County currently contracts Nutri-Blend, Inc. to land-apply the sludge generated by the facility (Pollutant Concentration Sewage Sludge). The sludge meets Class B pathogen reduction. Nutri-Blend is currently operating under a BUR permit.
12. Discharge Location Description: This facility discharges to the James River.
Name of USGS topo map: Drewry's Bluff (99B) (See **Attachment B**)
13. Material Storage: The POTW employs and stores a variety of chemicals in the treatment process. Some regularly utilized and stored chemicals include alum, polymer, magnesium hydroxide, sodium hypochlorite, and sodium bisulfite. These chemicals are stored in buildings with appropriate spill containment. The dewatered, digested sludge is stored on a curbed concrete pad.
14. Ambient Water Quality Information: Ambient water quality data from an upstream station at river mile 2-JMS099.30 was used in this analysis for Outfall 001 (James River discharge); this station, located at Buoy 157, approximately 1.4 miles upstream of the outfall was selected due to the close proximity of the discharge site. See **Attachment C**.

Additionally, the high flow months from the Richmond-Crater Water Quality Management Plan were applied to the permit limitations (as opposed to the high flow months indicated in the Flow Frequency Memorandum). The high flow months from the 208 Plan, which take into

consideration temperature and flow, are believed to be more appropriate than the Flow Frequency projected high flow months which only account for flow variations.

15. Antidegradation Review and Comments: The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect those uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. The receiving stream, James River, is determined to be a Tier 1 waterbody. The Richmond-Crater Water Quality Management Plan fully allocates BOD and ammonia to multiple dischargers in the segment for the purpose of limiting adverse effects to both dissolved oxygen and ammonia ambient concentrations. Also see TMDL discussion in # 28 below.

16. Site Inspection: June 15, 2010. See **Attachment D**.

17. Effluent Screening:

Effluent Data

See **Attachment E** for effluent data submitted with the permit application and obtained from DMRs and other submitted reports.

Modeling

This facility does not have a site-specific mixing model to be used in evaluating toxic parameters. In recent permit reissuances, freshwater inflow values have been utilized to estimate the amount of mixing in the receiving stream at the point of discharge. However, this reissuance uses the tidal default mixing ratios, expressed as total parts to effluent parts, of 2:1 for acute analyses and 50:1 for chronic evaluations. This change in modeling approaches stems from efforts to be more consistent with the modeling techniques used in nearby facilities (which employ either site-specific models or the tidal default ratios). As demonstrated below, the use of the tidal defaults, in this case, is less stringent than the 2005 modeling approach; however, antibacksliding prohibits the relaxation of permit limitations in this situation.

Modeling Criteria	Design Flow	Adjusted Low Flow*	% Mix Allowed*	2005 Stream Flow Used for Dilution	2005 Mixing Ratio	2010 Tidal Default Mixing Ratio
Acute	27 MGD	426 MGD	0.68%	2.90 MGD	1.1: 1	2: 1
Chronic	27 MGD	499 MGD	37.2%	186 MGD	7.9: 1	50: 1

*From the 2005 fact sheet; included in **Attachment F**.

DEQ is aware that the actual chronic mix is less than 50:1, but preliminary determinations indicate that changes in the chronic mixing have no effect on the limits as proposed in this reissuance. During the permit cycle, should an updated mixing model (such as CORMIX) become available, that model would be evaluated in the up-coming permit reissuance.

To achieve that mixing condition in MSTRANTI, the design flow was set to 27 MGD, the 1Q10 stream flow was set to 27 MGD, and the 7Q10 stream flow was set to 1323 MGD, as established using the equation below:

$$\frac{1 \text{ part Effluent}}{2 \text{ parts Total}} = \frac{Q \text{ design}}{Q \text{ stream} + Q \text{ design}} \quad \text{Eqn (1)}$$

$$\frac{1 \text{ part Effluent}}{50 \text{ parts Total}} = \frac{Q \text{ design}}{Q \text{ stream} + Q \text{ design}} \quad \text{Eqn (2)}$$

The tidal default values provide dilution ratios only for 1Q10 and 7Q10 scenarios; the 30Q5, 30Q10, and harmonic mean flow frequencies for tidal discharges are not defined. To provide a conservative analysis, these undefined values were set equivalent to that of the chronic flow frequency.

Consistent with all nearby major facilities, a different approach was utilized to evaluate conventional permit limitations. This reissuance continues to use the Richmond-Crater Water Quality Management Plan (RCWQMP), which was based on a model using freshwater inflow values, as a basis for cBOD₅, TSS, and some ammonia permit limitations.

Reasonable Potential Evaluation

A review of the effluent data submitted with the reissuance application indicated a need to examine the potential effects of radionuclides, chloroform, dichlorobromomethane, bis(2-ethylhexyl)phthalate (also known as Di-2-ethylhexyl phthalate), zinc, chloride, and hydrogen sulfide. All other parameters were considered absent for the purposes of the reasonable potential analyses. Evaluations for chloride, hydrogen sulfide, and zinc are included in Attachment F.

Attachment F also presents the evaluation of the need for ammonia and TRC limitations in the draft permit. Included in Attachment F are MSTRANTI input data sources, MSTRANTI printout with WLAs, and STATS.exe analyses for the appropriate parameters.

While the facility reported a quantifiable value for total recoverable copper, the dissolved copper sample was less than the quantification level, and no further reasonable potential analysis was performed. Similarly, the facility reported a quantifiable value for total cyanide but a free cyanide value less than the quantification level; as the WQS is for free cyanide, no further reasonable potential analysis was necessary.

The Human Health WLAs were established, using MSTRANTI, based on the applicable human health standards. A comparison of the measured concentration to the corresponding human health standard is tabulated below.

Parameter	Human Health Standard (µg/L)	WLA _{HH} (µg/L)	Concentration at Outfall 001 (µg/L)
Chloroform	11,000	550,000	<5, 20, 10
Dichlorobromomethane	170	8,500	<5, <5, 10
Bis(2-ethylhexyl)phthalate	22	1,100	<5, 15, 32
Zinc	26,000	1,300,000	23

As indicated above, zinc, chloroform, dichlorobromomethane, and chlorodibromomethane do not present a reasonable potential to cause or contribute to a water quality standard violation.

Parameter	Human Health Standard	WLA _{HH, PWS}	Concentration at Outfall 001
*Beta Particle & Photon Activity	4 mrem/yr	200 mrem/yr	10.3 pCi/L
*Uranium	30 µg/L	1,500 µg/L	<0.6 pCi/L ≈ <0.90 µg/L
*Gross Alpha	15 pCi/L	750 pCi/L	<1.3 pCi/L
*+Combined Radium 226 & 228	5 pCi/L	250 pCi/L	1.05 pCi/L

* NOTE: The Human Health Standard for this parameter is only applicable in Public Water Supply (PWS) designated waters.

+ The permittee provided separate analytical results for Radium 226 and Radium 228 which were 0.5 pCi/L and <1.1 pCi/L, respectively; using half the quantification level of Rd-228 as a reportable value, these two results were summed to establish the combined radium result.

The WLA_{HH, PWS} were derived using the following calculation:

$$WLA = \frac{WQS(Q \text{ stream} + Q \text{ design})}{Q \text{ design}} \quad \text{Eqn (3)}$$

where WLA = WLA_{HH, PWS}

WQS = Human Health Standard as defined in the table above

Q stream = total stream parts, 1323 MGD (see discussion above)

Q design = 27 MGD.

In the application, the values reported for Beta Particle and Photon Activity are in units of activity (i.e. pCi/L) whereas the applicable water quality standard is an exposure in terms of mrem/yr. The EPA has established this same standard for community potable water systems. EPA guidance states that compliance with the potable water standard may be assumed if the average annual concentration of Beta Particle and Photon Activity is less than 50 pCi/L (Radionuclides in Drinking Water: A Small Entity Compliance Guide. EPA 815-R-02-001, February 2002.; <http://www.epa.gov/safewater/radionuclides/compliancehelp.html>). Consequently, the reported concentrations of Beta Particle and Photon Activity are considered to meet the applicable water quality standards.

The application reported uranium concentration in terms of activity, pCi/L whereas the standard is in terms of mass, µg/L. EPA has suggested conversion factors for activity to mass ranging from 0.67 to 1.5 pCi/µg (USEPA 2000. National Primary Drinking Water Regulations; Final Rule 65 FR 236; December 7, 2000.). To provide the most conservative estimate of mass-based concentration, the 0.67 pCi/µg conversion factor was used, resulting in an estimated <0.90 µg/L Uranium.

As indicated above, these parameters do not present a reasonable potential to cause or contribute to a water quality standard violation.

18. Effluent Limitation Development:

Table 2: Outfall 001

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				
		MO AVG	WE AVG		MIN	MAX
Flow (MGD)	NA	NL – monitoring only			NA	NL
pH (standard units)	2	NA		NA		6.0 S.U. 9.0 S.U.
cBOD ₅	June – October	4	7 mg/L	726 kg/d	11 mg/L	1090 kg/d
	November – May	4	11 mg/L	1090 kg/d	16 mg/L	1635 kg/d
Total Suspended Solids (TSS)	June – October	3	7.1 mg/L	726 kg/d	11 mg/L	1090 kg/d
	November – May	3	11 mg/L	1090 kg/d	16 mg/L	1635 kg/d
Ammonia as N	June – October	4	4.26 mg/L	435 kg/d	5.78 mg/L	583 kg/d
	November – May	4	6.22 mg/L	635 kg/d	8.55 mg/L	869 kg/d

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS			
		MO AVG	WE AVG	MIN	MAX
Total Phosphorus (as P)	5	2.0 mg/L	NL kg/d	NA	NA
Total Nitrogen – Year-to-Date (upgrade only)	5	NL		NA	NA
Total Nitrogen – Annual Average (upgrade only)	5	5.8 mg/L		NA	NA
Dissolved Oxygen	3	NA		NA	6.0 mg/L
Total Residual Chlorine (TRC)	1	10 µg/L	13 µg/L	NA	NA
*TRC Contact (Parameter 157)	3	NA		NA	1.0 mg/L
*TRC Contact (Parameter 213)	3	NA		NA	0.60 mg/L
<i>E.coli</i>	2	126 N/100 mL (geometric mean)		NA	NA

1. Water Quality Based Effluent Limitation

3. Best Engineering Judgment (BEJ)

5. Nutrient Regulations and DEQ Related Guidance

2. Water Quality Standards

4. Richmond Crater Water Quality Management Plan

* Samples are taken prior to dechlorination.

Conventional Pollutants and Nutrients

As no changes have occurred in the treatment facility, the cBOD₅ load limitations remain based on the Richmond Crater Interim Water Quality Management Plan from 1989, the 2010 table, and the corresponding concentration limitations were calculated using the RCWQMP waste load allocations and a design flow of 27.0 MGD; the 208 Plan is included in **Attachment G**. The TSS limitations were established using the cBOD₅ load limitations as a guideline and Best Engineering Judgment (BEJ) as a basis.

The 85% removal clause for influent cBOD₅ and TSS was not included in this permit. 40 CFR 133.105 associates a secondary treatment limitation of 30 mg/L with the minimum 85% removal requirement. It can be presumed that if a facility meets a limit more stringent than secondary treatment standards, then the intent of the 85% removal clause is being met. Based on the effluent flows reported and recent inspection reports, Inflow and Infiltration (I&I) has not been of concern at this facility. This special condition has not been included in many permits which have conventional permit limitations more restrictive than required by secondary treatment standards.

Several of the cBOD₅ limitations were revised to become in accordance with the RCWQMP Loading Limitations; in order to do so, load calculations required rounding down. Per the plan, a summer load of 1602 lb/d and a winter load of 2403 lb/d were allotted. The calculations were as follows:

June – October, Monthly Average

$$1602 \text{ lb/d} \times 0.4536 \text{ kg/lb} = 726.667 \text{ kg/d} \approx 726 \text{ kg/d}$$

$$\frac{1602 \text{ lb/d} \times 0.4536 \text{ kg/lb}}{27 \text{ MGD} \times 3.785 \text{ L/gal}} = 7.11 \text{ mg/L} \approx 7 \text{ mg/L}$$

November - May, Monthly Average

$$2403 \text{ lb/d} \times 0.4536 \text{ kg/lb} = 1090 \text{ kg/d}$$

$$\frac{2403 \text{ lb/d} \times 0.4536 \text{ kg/lb}}{27 \text{ MGD} \times 3.785 \text{ L/gal}} = 10.66 \text{ mg/L} \approx 11 \text{ mg/L}$$

Guidance Memorandum 06-2016, Significant Figures for DMRs, was not applied to cBOD₅ and TSS loading limitations; these limitations were written as expressed in the governing regulation (the Richmond Crater Water Quality Management Plan). The concentration limitations for these parameters were based on GM06-2016 (taking into consideration the requirements of the RCWQMP for cBOD₅).

All nutrient parameter limitations and associated monitoring were revised or included in accordance with the applicable guidance memorandum (Guidance Memorandum 07-2008, Amendment 2).

Part I.A.2 of the permit contains a tier for nutrients. The permit was tiered with respect to TN Annual Average Concentration limitations to allow for the issuance of a CTO for the Integrated Fixed Film Activated Sludge (IFAS) system which is projected to be installed during this permit cycle. This addition negates the need to modify the permit to include the appropriate nutrient limitations once the CTO for the upgrade is granted. The numeric limitations for TN annual average concentrations were selected based on summary data submitted in the Preliminary Engineering Report (PER) (see **Attachment H**) and to be consistent with the Falling Creek VPDES Permit (VA0024996).

Monitoring and reporting requirements for the individual components of the nutrients (i.e. TKN, NO₃-NO₂, orthophosphate, etc) as well as the monthly average concentrations for total nitrogen were not included as these parameters are already reported on the nutrient general permit DMR. However, TN year-to-date and annual average concentration reporting requirements were included in the individual permit as these calculations are not performed or reported on the nutrient general permit DMR.

Dissolved Oxygen (DO)

The WQS (9 VAC 25-260-185.A) establish minimum DO concentrations of equal to or greater than 5 mg/L (instantaneous minimum) and equal to or greater than 6 mg/L (7-day mean) for migratory fish spawning and nursery; these WQS are applicable February 1 through May 31. The open water DO WQS are applicable year round and require a 30-day mean equal to or greater than 5.5 mg/L, a 7-day mean equal to or greater than 4 mg/L, and an instantaneous minimum of equal to or greater than 4.3 mg/L. The 2005 permit required a minimum DO of 5.9 mg/L based on the Richmond Crater plan. Using BEJ, the DO effluent limits were increased to be no less than the most stringent ambient water quality standard (the 6.0 mg/L minimum weekly average for the migratory fish spawning and nursery designated use). In order to minimize reporting requirements, the permit was written with one, most controlling, permit limitation. Accordingly, a minimum DO limitation of 6.0 mg/L was included in the draft permit.

Ammonia and TRC

See Attachment F for further discussion related to the inclusion of monitoring and/or limitations for these parameters.

Mass loading limitations for ammonia were retained with this reissuance based on the inclusion of monthly average loading limitations in the RCWQMP. The weekly average mass loading ammonia limitations were retained from the 2005 permit to avoid anti-backsliding concerns.

GM06-2016 states that limits should be expressed in the same number of significant digits as the underlying standard or modeling basis. The RCWQMP June- October load is written as three significant digits whereas the November- May load is expressed as four. Converting the two loads into concentrations yields a monthly average limitation of 4.26 mg/L and a weekly average limitation of 6.222 mg/L. However, the analytical analysis for ammonia is not capable of reporting to the thousandth's place (0.001 mg/L); accordingly, the weekly average limitation was written to only three significant digits.

Monitoring Frequencies

Sampling frequencies for flow, pH, and *E. coli* were selected based on the 2010 permit manual recommendations. Ammonia, cBOD₅, and DO qualified for reduced monitoring frequencies (See Attachment K and Item #27 below). As per the June 2003 Water Permit Managers' Meeting Minutes, the baseline monitoring frequency for TSS is 1/Month for all facilities. The Nutrient General Permit was used to establish the monitoring frequencies for the nutrient parameters. The TRC monitoring frequency was requested by the permittee on July 1, 2010.

19. Basis for Sludge Use & Disposal Requirements: Chesterfield County currently contracts Nutri-Blend, Inc. to land-apply the sludge generated by the facility. The sludge meets Class B pathogen reduction. Applicable sludge requirements are addressed by the facility that receives the sludge.
20. Antibacksliding: With the exception of the ammonia and TSS concentration limitations, all limitations in the proposed permit are the same or more stringent than the limitations in the 2005 permit. The ammonia concentration limitations are now expressed to the number of significant digits in the underlying water quality standard, taking the analytical analysis constraints into consideration (i.e. lab methods cannot reach the thousandth's place, 0.001 mg/L); the TSS monthly average concentration was 10.7 mg/L and is now expressed in two significant digits. As the limitations themselves have not changed, merely the expression of those limits, antibacksliding has not been violated.
21. Compliance Schedules
Revisions to the water quality standard regulations led to a new DO limitation. As this is a more restrictive effluent limitation, it is appropriate to allow a period of time for the permittee to achieve compliance. However, the facility is already complying with the newly established permit limit so no additional time is needed to achieve compliance. Consequently, a compliance schedule for DO was not given.
22. Additional Limitations and Monitoring Requirements – Part I.B.
Required by Sewage Collection and Treatment Regulations, 9VAC25-790 and Virginia Water Quality Standards 9 VAC 25-260-170, bacteria; other recreational waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This special condition ensures proper operation of chlorination equipment to maintain adequate disinfection.

The TRC minimum of 0.60 m/L was established to demonstrate an adequate bacterial kill; the alternative language, which allows bacteria testing within 15 minutes of a TRC value <0.60 mg/L, gives the facility flexibility in demonstrating that a sufficient bacterial kill has occurred. Additionally, the agency and facility do not have to address any inconsequential violations of this limitation.
23. Special Conditions
Part I.C.1: 95% Capacity Reopener
Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-200 B 4 for all POTW and PVOTW permits.

Part I.C.2: O&M Manual Requirement
Rationale: Required by Code of Virginia, §62.1-44.19; Sewage Control and Treatment Regulations, 9 VAC 25-790; VPDES Permit Regulation, 9 VAC 25-31-190 E.

Part I.C.3: Licensed Operator Requirement

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-200 C and the Code of Virginia § 54.1-2300 et seq., Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.), require licensure of operators.

Part I.C.4: Reliability Class

Rationale: Required by Sewage Collection and Treatment Regulations, 9 VAC 25-790 for all municipal facilities.

Part I.C.5: Sludge Use and Disposal

Rationale: VPDES Permit Regulation, 9 VAC 25-31-100 P, 220 B 2, and 420 through 720; and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal.

Part I.C.6: Sludge Reopener

Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-220 C for all permits issued to treatment works treating domestic sewage.

Part I.C.7: Compliance Reporting

Rationale: Authorized by VPDES Permit Regulation, 9 VAC 25-31-190 J 4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limitation or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

Part I.C.8: Materials Handling/Storage

Rationale: 9 VAC 25-31-50 A prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia §62.1-44.16 and 62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

Part I.C.9: Reopeners

Rationale:

- a. Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.
- b. 9 VAC 25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade.
- c. 9 VAC 25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

Part I.C. 10: Indirect Dischargers

Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-200 B 1 and B 2 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

Part I.C. 11: CTO, CTC Requirement

Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790. 9 VAC 25-40-70.A authorizes DEQ to include technology-based annual concentration limitations in the permits of facilities that have installed nutrient control technology, whether by new construction, expansion, or upgrade.

Part I.C.12: Nutrient Reporting Calculations

Rationale: §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this definition is carried forward in 9 VAC 25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, this special condition is intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

Part I.C.13: Suspension of Annual Average Concentration Limitations for E3/E4 Facilities

Rationale: 9 VAC 25-40-70 B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

Part I.C.14: Effluent Monitoring Frequencies

Rationale: Permittees are granted a reduction in monitoring frequency based on a history of permit compliance. To remain eligible for the reduction, the permittee should not have violations related to the effluent limits for which reduced frequencies were granted. If permittees fail to maintain the previous level of performance, the baseline monitoring frequencies should be reinstated for those parameters that were previously granted a monitoring frequency reduction.

Part I.C.15: Closure Plan

Rationale: Code of Virginia § 62.1-44.19 of the State Water Control Law. This condition establishes the requirement to submit a closure plan for the wastewater treatment facility if the treatment facility is being replaced or is expected to close.

Part I.D: Pretreatment

Rationale: VPDES Permit Regulation, 9 VAC 25-31-730 through 900, and 40 CFR part 403 require certain existing and new sources of pollution to meet specified regulations.

Part I.E: Whole Effluent Toxicity (WET) Monitoring Program

Rationale: VPDES Permit Regulation, 9 VAC 25-31-210 and 220 I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. See **Attachment I** for the WET evaluation.

Part I.F and Part I.G—Sewage Sludge Land Application Limitations and Monitoring Requirements

Rationale: VPDES Permit Regulation, Part VI-Subpart B.

Part II, Conditions Applicable to All VPDES Permits

The VPDES Permit Regulation at 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

24. Changes to Current Permit:

Table 3: Part I.A.1

Parameter Changed	Effluent Limits Changed		Monitoring Requirement Changed		Reason for Change	Date
	From	To	From	To		
Orthophosphate, Total Nitrogen, TKN, Nitrate-Nitrite	NL	-	1/Week	-	Monitoring was deleted in the 2007 permit authorized change to account for the new nutrient monitoring schema of the nutrient	6/2010

Parameter Changed	Effluent Limits Changed		Monitoring Requirement Changed		Reason for Change	Date
	From	To	From	To		
All nutrient loading parameters (except for Total Phosphorus)	NL	-	1/Month or 1/ Year	-	general permit and in response to nutrient policy changes.	6/2010
DO Minimum	5.9 mg/L	6.0 mg/L	1/Day	4/Week	The monitoring frequency was revised in accordance with the performance-based monitoring evaluation. The limitation was revised to address the revised Water Quality Standards (9 VAC 25-260-185). While this limitation is more stringent than required by the various regulations, this approach minimizes the chance of reporting errors.	6/2010
TRC	-	-	1/Day	12/ Day	Revised per July 1, 2010 permittee comment letter	7/2010
<i>E.coli</i>	-	126 N/100 mL	-	4/Month	40 CFR 122.44(d)(1)(iii); new agency policy in response to EPA comments Previously, minimum TRC concentrations in the chlorine contact tank served as a surrogate to indicate an adequate bacterial kill; this surrogacy is no longer acceptable. However, it is presumed that no additional equipment or plant modifications are necessary to demonstrate compliance with this limitation; therefore, no compliance schedule was given.	6/2010
Ammonia – monthly average	4.3 mg/L 6.2 mg/L	4.26 mg/L 6.22 mg/L	-	-	The concentration limitations were revised in accordance with GM06-2016 with respect to the number of significant digits in the underlying water quality base; see #18 above.	6/2010
Ammonia - weekly average	5.7 mg/L 8.5 mg/L	5.78 mg/L 8.55 mg/L	-	-		
cBOD ₅	7.1 mg/L 10.7 mg/L 16.0 mg/L	7 mg/L 11 mg/L 16 mg/L	-	-	The concentration limitations were revised in accordance with GM06-2016 with respect to the precision of the applicable test method and to be consistent with the precision of the QL required in Part I.C.7; see #18 above.	7/2010
TSS	10.7 mg/L 16.0 mg/L	11 mg/L 16 mg/L	-	-	The concentration limitations were revised in accordance with GM06-2016 with respect to the number of significant digits.	6/2010

Part I.A.2 of the permit is new and was not included in the current permit; therefore, a change table is not necessary.

Table 4: Part I.B-G

From	To	Special Condition Changed	Reason for Change	Date
Cover page	Cover page	-	Revised in accordance with current regulations and DEQ policy; specifically, the formatting, and special standards were revised.	6/2010
Part I.A.1	Part I.A.1	Preamble	Revised due to current plans to install nutrient removal technology; a PER for this upgrade has been submitted	6/2010
Part I.A.1.a.(1)	Part I.A.1.a.(1)	Design flow	Revised for clarity	6/2010
Part I.A.1.a.(3)	Part I.A.1.a.(2)	Nutrient Monitoring and Limitations	Revised to reflect additional nutrient-related special conditions (GM07-2008, Amd 2)	6/2010
	Part I.A.1.a.(3)	WGP Coverage	New, reflects current agency policy conditions (GM07-2008, Amd 2)	6/2010
	Part I.A.1.a.(5) & (6)	Significant digits	New, reflects current agency policy (GM06-2016)	6/2010
	Part I.A.1.a.(7)	TRC Sampling	New, reflects permittee comments on the draft permit and DEQ accommodations (See Attachment K)	7/2010
	Part I.A.2	Nutrient Upgrade Tier	New, reflects the permittee's intentions to upgrade the plant per the submitted PER; this addition negates the need to modify the permit to include the appropriate nutrient limitations once the CTO for the upgrade is granted. New limitations were included to address new nutrient regulations (i.e. 9 VAC 25-720 and 820)	6/2010
Part I.A.2	Part I.A.3	Sewage Sludge Limitations and Monitoring Requirements	Definitions of "NA" and "1/2 Months" added; 3.e was added for clarity	6/2010
Part I.B.	Part I.B.	TRC Limitations and Monitoring Requirements	Revised to reflect permittee comments on the draft permit (See Attachment K). Specialized permit language was included in B.2 to simplify the permit terms and reduce redundancy should chlorination not be utilized as the mode of disinfection. The continuation of this customized special condition language was requested by the permittee on May 5, 2010, and DEQ is accommodating this request due to the facility being a VEEP participant at the E3 level. The bacteria references in Part I.B.2 were revised from 235 N/100 mL to 126 N/100 mL to reflect changes in the WQS regulations.	7/2010
Part I.C.1	Part I.C.1	95% Capacity Notification	No changes	6/2010
Part I.C.3	Part I.C.2	O & M Manual	Revised to reflect January 27, 2010 Permit Manual	6/2010
Part I.C.4	Part I.C.3	Licensed Operator	No changes	6/2010
Part I.C.5	Part I.C.4	Reliability Class	No changes	6/2010

From	To	Special Condition Changed	Reason for Change	Date
Part I.C.6	Part I.C.5	Sludge Use and Disposal	Revised to reflect January 27, 2010 Permit Manual	6/2010
Part I.C.7	Part I.C.6	Sludge Reopener	No changes	6/2010
Part I.C.8	Part I.C.7	Compliance Reporting	Revised to reflect January 27, 2010 Permit Manual; the language deviates slightly from the manual in order to be more concise and less redundant.	6/2010
Part I.C.9	Part I.C.8	Materials Handling/Storage	No changes	6/2010
Part I.C.11 Part I.C.12	Part I.C.9	Reopeners	Revised to reflect GM07-2008, Amendment 2	6/2010
Part I.C.2	Part I.C.10	Indirect Dischargers	Revised; the last sentence referencing the Pretreatment Program was removed to reflect agency guidance (January 27, 2010 Permit Manual)	6/2010
Part I.C.10	Part I.C.11	CTC, CTO Requirement	Reflects January 27, 2010 Permit Manual and GM07-2008, Amendment 2	6/2010
Part I.C.13	Part I.C.12	Nutrient Reporting Calculations	The Nutrient Reporting calculation varies from guidance in that it clarifies where the monthly average concentrations are reported (i.e. the nutrient general permit DMR).	6/2010
-	Part I.C.13	Annual Average Concentrations		6/2010
Part I.C.16	Part I.C.14	Effluent Monitoring Frequencies	Revised to update parameters and frequencies	6/2010
	Part I.C.15	Closure Plan	New, reflects PRO Staff Decisions (December 2, 2008)	6/2010
Part I.D	Part I.D	Pretreatment	<p>Revised per January 27, 2010 Permit Manual and PRO boilerplate</p> <p>Specifically, Parts I.D: 2.a(1), 2.a(9), 2.e, 2.j, 5.a, 5.c, 7, 8, 10, 11, 12, 13, and 14 were revised to clarify reporting time frames, requirements, and deadlines and to address non-discharging pretreatment facilities. Additionally, acronyms were spelled out with their first use.</p> <p>With the exception of the annual report (which requires an original signature), electronic submissions of pretreatment requirements are preferred.</p> <p>Additional changes were made in response to permittee comments (See Attachment K)</p>	7/2010
Part I.E	Part I.E	Whole Effluent Toxicity	Revised per D. Debiasi (CO). The new testing endpoints do not constitute backslicing as the endpoints aren't criteria; while the endpoints are used to evaluate the data, they are not limitations and are not used as a "pass/fail" type of point. Even if the permittee meets the endpoints specified, a limitation may be needed and it may not be that endpoint.	6/2010
Part I.F	Part I.F	Sludge Records	Updated to reflect changes in the special condition numbering	6/2010
Part I.G	Part I.G	Sludge Reporting		6/2010

From	To	Special Condition Changed	Reason for Change	Date
Part I.A.1.a.(2)	[deleted]	Total Nitrogen calculation	Removed as Total Nitrogen monitoring is not required under Part I.A.1.	6/2010
Part I.A.1.c	[deleted]	Sampling Location	Removed as this condition is not included in DEQ guidance and the compliance point/sampling location is defined in the O&M Manual.	6/2010
Part I.C.14	[deleted]	Basis of Design		
Part I.C.15	[deleted]	Interim Optimization Plan	Removed in accordance with GM07-2008, Amendment 2	6/2010
Part I.C.17	[deleted]	General Permit Controls		

25. Variances/Alternate Limits or Conditions: None.

26. Public Notice Information required by 9 VAC 25-31-280 B:

Comment period: Publishing Newspaper: *Richmond Times- Dispatch*
 Publication Dates: July 30, 2010 and August 6, 2010
 Start Date: July 30, 2010 End Date: August 30, 2010

All pertinent information is on file and may be inspected or copied by contacting Gina Kelly at:

Virginia Department of Environmental Quality (DEQ)
 Piedmont Regional Office
 4949-A Cox Road
 Glen Allen, Virginia 23060-6296

Telephone Number: 804/527-5048
 Facsimile Number: 804/527-5106
 Email: Virginia.Kelly@deq.virginia.gov

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may review the draft permit and application at the DEQ Piedmont Regional Office by appointment.

Public Notice Comments: The Richmond Regional Planning District Commission (RRPDC) received one "no comment" response from Chesterfield County. No other comments were received during the public comment period. VDH had no objections to the draft permit.

27. Additional Comments:

a. Previous Board Action: None.

b. Staff Comments:

- Performance-based monitoring reduction was reevaluated with this permit reissuance (see **Attachment J**). The permit manual suggests that reduced monitoring is not appropriate when a facility has received a Warning Letter, Notice of Violation, etc during the previous three years. Although the permittee received a Warning Letter in May 2008 for TSS exceedences, the facility is a participant in the Virginia Environmental Excellence Program (VEEP) at the Exemplary Environmental Enterprise (E3) level and is therefore eligible for associated regulatory flexibility. Given the facility's performance, ammonia and cBOD₅ continue to qualify for reduced monitoring frequencies; additionally, DO qualified for reduced monitoring, using the new limitation for the evaluation.

While the DO limitation is becoming more stringent, the minimum DO reported in the past three years is 0.7 mg/L above the new DO limitation, and the long term average for this parameter is 59.3% higher than the new limitation. The permit manual does not prohibit the application of reduced monitoring to parameters with more stringent limitations, so long as they facility has a documented record of compliance. Accordingly, reduced monitoring is appropriate and was granted for this parameter.

As per the June 2003 Water Permit Managers' Meeting Minutes, the baseline monitoring frequency for TSS is 1/Month for all facilities, effectively applying reduced monitoring; no additional reduction is applicable at this time.

The Proctors Creek facility is not modifying the primary clarifiers, secondary clarifiers, advanced wastewater treatment tanks, or post aeration tanks; the facility is enhancing the existing activated sludge process by increasing the surface area of the film which maintains the biologically active organisms. An external carbon source, such as methanol, will be added to the BNR process to enhance denitrification. No projects that would enhance phosphorus removal are currently planned for this facility. As discussed and decided in the Water Permit Managers' February 2008 conference call, reduced monitoring may be maintained at a facility which is undergoing an enhancement of treatment. Accordingly, these reductions are applicable at both the current facility and the upgraded facility.

- This facility discharges to a receiving stream section with the special standards "a," "z," and "bb." The facility does not discharge to shellfish waters, therefore, special condition "a" does not apply. Because the location of outfall 001 is not within the designated boundaries, special standard "z" does not apply. Special standard "bb" involves chlorophyll a; the nutrient general permit and Richmond Crater WQMP allocations adequately address chlorophyll a concerns.
- Financial assurance does not apply to this facility because it is a POTW.
- A registration statement for the nutrient general permit has been received and the associated general permit issued. Chesterfield County has elected to combine (i.e. "bubble") the allocated loads for the Proctor's Creek and Falling Creek WWTPs as allowed under the WGP.
- GM07-2008, Amd.2 suggests the inclusion of the Watershed General Permit special condition in permits where the former Nutrient Enriched Waters (NEW) policy was in effect; the special condition waives the mass loading limitations previously established. While this permit has a TP limitation of 2.0 mg/L based on the NEW policy, no mass loading limitation was established (i.e. monitoring only was required for mass load).

Consequently, this special condition is not applicable to this permit and therefore, was not included.

- In accordance with an email received from CO staff on April 24, 2008, Part I.E.2 was revised to require only one copy of the WET test be submitted with the original; two copies (as per GM 00-2012) are no longer necessary.
- Discharges associated with exposure to industrial stormwater at this site are addressed via VAR051394.
- The discharge is in conformance with the existing planning documents for the area.

28. 303(d) Listed Segments (TMDL): This facility discharges directly to the James River. The James River stream segment receiving the effluent is listed for not supporting the Recreation, Aquatic Life, and Fish Consumption Uses in Category 5A of the 2008 approved 303(d) list; the wildlife use was fully supporting in the 2008 cycle, and the Migratory Spawning Subuse was not assessed. The segment is listed as impaired for *E. coli*, Submerged Aquatic Vegetation (SAV), chlorophyll a, and PCBs. See Attachment C for additional details regarding the assessment, impairments and TMDL fact sheets.

As the facility has disinfection practices in place as well as *E. coli* limitations, the facility should not cause or contribute to the bacteria impairment. The facility has provided analytical data indicating the absence of PCBs in the effluent.

With respect to PCBs and *E. coli*, TMDLs have not been prepared or approved for the segment. This permit has a monthly geometric mean limitation of 126 N/100 mL for *E. coli* that requires compliance with the standard prior to discharge. Given these limits this facility can neither cause nor contribute to the observed violation of the standards. No limit for PCBs is included in this permit because data using the ultra-low detection level (Method 1668B) has not been provided to demonstrate that a limitation is necessary at this time.

Per the 2008 Impairment Factsheets, it is not anticipated that TMDLs will be completed for the SAV and chlorophyll a impairments as the impairments are being addressed via other means. However, the permit has a minimum DO limitation which addresses the SAV impairment and nutrient limitations which address the chlorophyll a impairment.

The permit also contains a re-opener condition that may allow these limits to be modified, in compliance with section 303(d)(4) of the Act once a TMDL is approved.

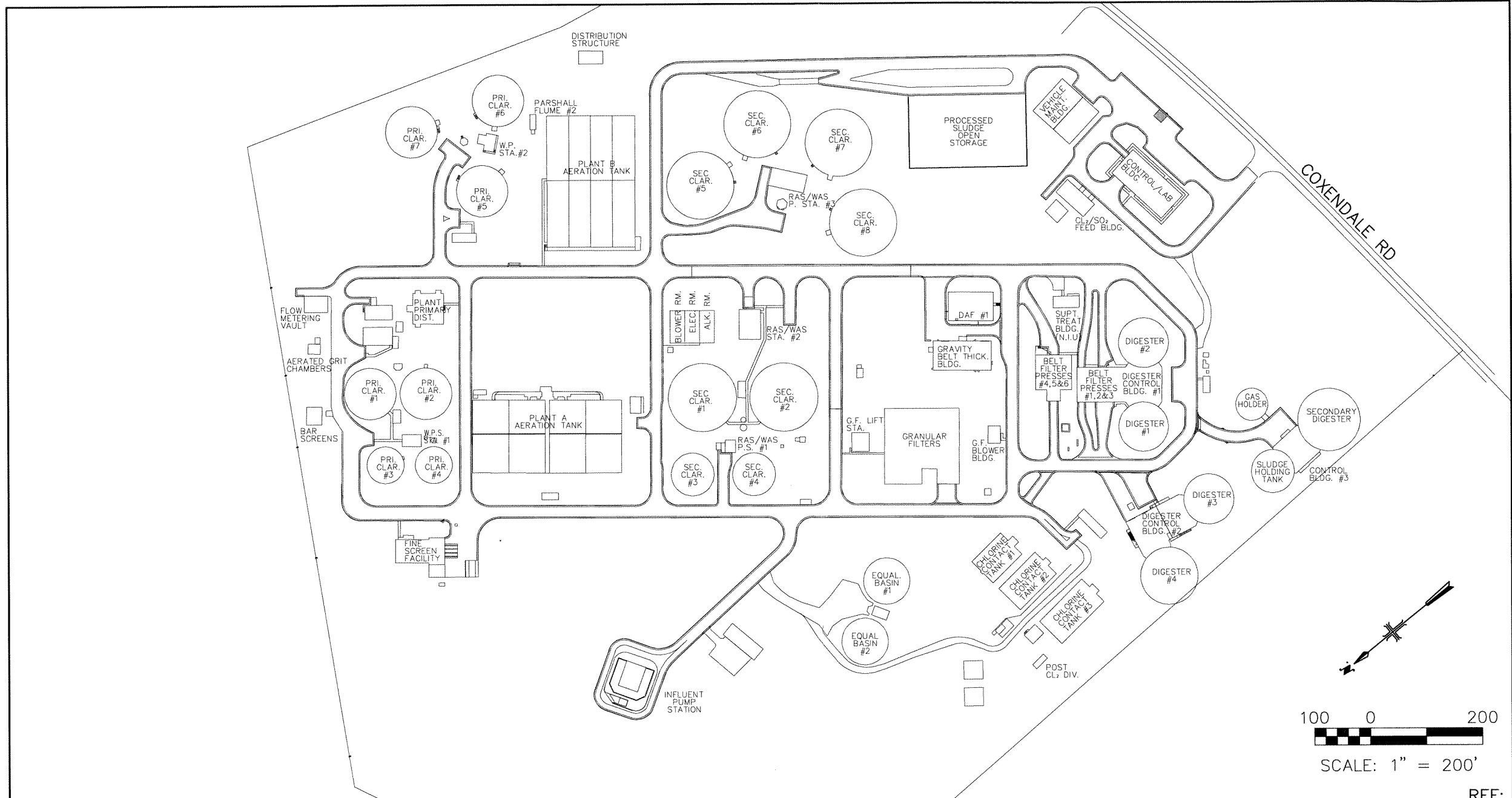
29. Summary of attachments to this Fact Sheet:

Attachment A	Facility Diagram
Attachment B	Location Map
Attachment C	Ambient Data
Attachment D	Site Visit
Attachment E	Effluent Data
Attachment F	Effluent Limitation Analysis
Attachment G	Richmond Crater Water Quality Management Plan
Attachment H	PER Summary Documents
Attachment I	WET Testing Evaluation and Memorandum
Attachment J	Reduced Monitoring Evaluation
Attachment K	Permittee Comments on Draft Permit and DEQ Response

Fact Sheet
Proctors Creek WWTP

Attachment A

Facility Diagram



**MALCOLM
PIRNIE**

CHESTERFIELD COUNTY

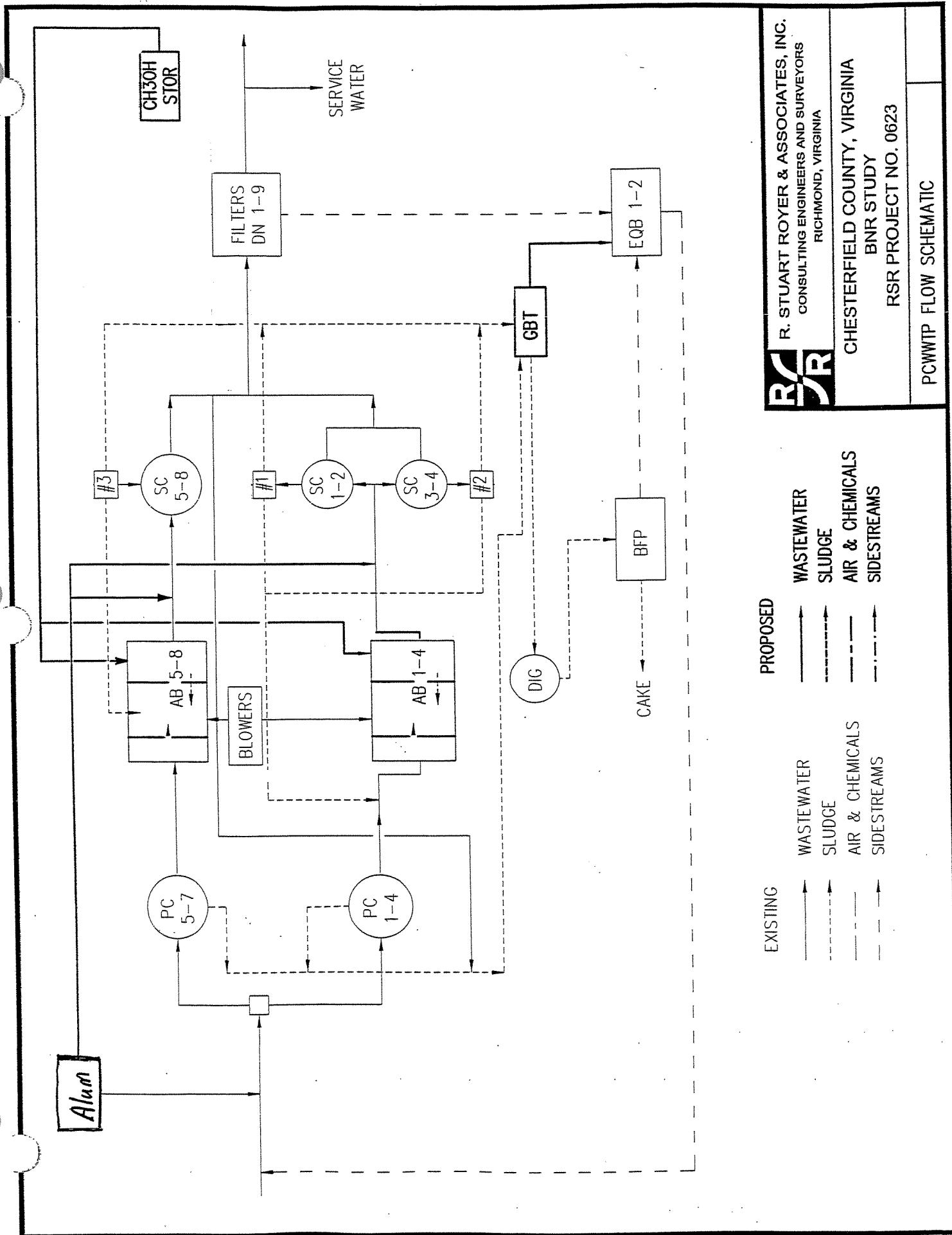
PROCTORS CREEK WASTEWATER TREATMENT PLANT
OVERALL SITE PLAN

SCALE: 1" = 200'

MALCOLM PIRNIE, INC.

NOVEMBER 2009

REF:
SCALE: 1" = 200'



R. STUART ROYER & ASSOCIATES, INC.
CONSULTING ENGINEERS AND SURVEYORS
RICHMOND, VIRGINIA

CHESTERFIELD COUNTY, VIRGINIA
BNR STUDY
RSR PROJECT NO. 0623

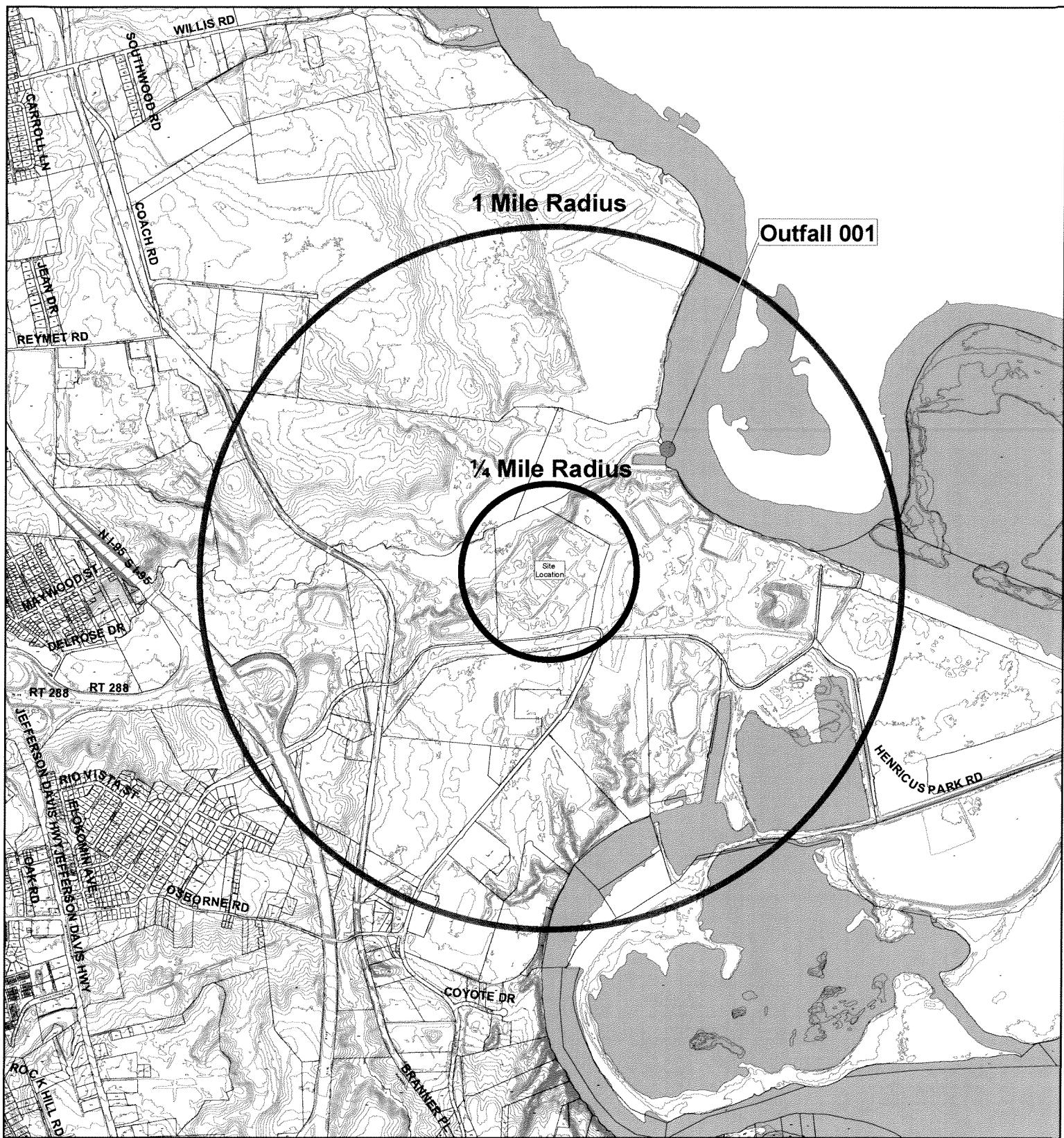
PCWWTP FLOW SCHEMATIC

Fact Sheet
Proctors Creek WWTP

Attachment B

Location Map

Chesterfield County, Virginia Proctors Creek WWTP



ACCURACY OF INFORMATION NOT GUARANTEED

This information is being provided to you as a public service.
WE DO NOT GUARANTEE ITS ACCURACY.
By using it in any way, you are agreeing to
Release the County, its employees and
officials from responsibility for
any consequence(s) if it proves
to be inaccurate.

NAD_1983_StatePlane_Virginia_South_FIPS_4502_Feet
State Plane: 11806588.45,3666317.44
Lat: 37°23'12.65351465"N
Long: 77°23'9.24899400"W

1 inch = 2,000 feet



Fact Sheet
Proctors Creek WWTP

Attachment C

Ambient Data

MEMORANDUM

**DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060**

SUBJECT: Flow Frequency Determination / 303(d) Status
Proctors Creek WWTP – VA0060194

TO: Gina R. E. Kelly, P.E.

FROM: Jennifer V. Palmore, P.G.

DATE: January 20, 2010

REVISED: May 6, 2010

COPIES: File

The Chesterfield County's Proctors Creek Wastewater Treatment Plant discharges to the James River near Dutch Gap, VA. The outfall is located at rivermile 2-JMS097.94. Flow frequencies have been requested for this outfall for use in developing effluent limitations for the VPDES permit. At the discharge point the river is tidally influenced and flow frequencies cannot be determined. The freshwater inflow into the James River at the fall line is reported, however the default tidal dilution ratios should be applied to permit limitations.

The flow frequencies for the freshwater inflow were developed based on a drainage area comparison between the fall line and the USGS continuous record gage on the James River at the Route 45 Bridge in Cartersville (#02035000). The Cartersville gage has been in operation from 1898 through present. However, the flow in the James is currently regulated by guaranteed released from Gathwright Dam (Lake Moomaw), therefore the flow frequencies for the gage were developed by the Charlottesville office based on data since 1979 only. The data for the reference gage and the fall line are presented below.

James River at Cartersville, VA (#02035000):

Statistical Period: 1980-2003

Drainage area: 6,252 mi²

1Q30 = 540 cfs	High Flow 1Q10 = 1530 cfs
1Q10 = 638 cfs	High Flow 7Q10 = 1810 cfs
7Q10 = 717 cfs	High Flow 30Q10 = 2220 cfs
30Q10 = 918 cfs	HM = 3020 cfs
30Q5 = 1020 cfs	

James River at fall line:

Drainage Area = 6,755 mi²

1Q30 = 583 cfs (377 MGD)	High Flow 1Q10 = 1653 cfs (1068 MGD)
1Q10 = 689 cfs (446 MGD)	High Flow 7Q10 = 1956 cfs (1264 MGD)
7Q10 = 775 cfs (501 MGD)	High Flow 30Q10 = 2399 cfs (1550 MGD)
30Q10 = 992 cfs (641 MGD)	HM = 3263 cfs (2109 MGD)
30Q5 = 1102 cfs (712 MGD)	

This analysis does not address withdrawals, discharges, or springs influencing the flow of the James River between Cartersville and the fall line. The high flow months are January through May.

Flow Frequency Determination
VA0060194
January 20, 2010
Page 2

Monitoring data from station 2-JMS099.30 is attached. The station is located at Buoy 157, approximately 1.4 miles upstream of the outfall. The field data and hardness data from this station represent background ambient conditions.

The James River at the discharge point was assessed as a Category 5A water in the 2008 305(b)/303(d) Water Quality Assessment Integrated Report. The applicable fact sheets are attached.

The James River from the Appomattox River to the Chickahominy River was originally listed on the 1998 list as fully supporting but threatened of the Aquatic Life Use goal based on chlorophyll a violations. During the 1998 cycle, EPA extended the segment upstream to the fall line and downgraded the river to not supporting the Aquatic Life Use, citing nutrient concerns. The Chesapeake Bay water quality standards have since been implemented. The Upper Tidal Freshwater James River failed the Shallow Water Subuse's submerged aquatic vegetation (SAV) criteria. In addition, a special site-specific chlorophyll standard for the mainstem James River was adopted during the 2008 cycle; the upper tidal freshwater segment exceeded both the spring and summer seasonal means. Mercury is considered an "observed effect" due to a sediment screening value exceedance at 2-JMS097.77. The Migratory Spawning and Nursery Subuse was not assessed.

The James River from the fall line to the Appomattox River has been assessed as not supporting of the Recreation use support goal since 1996. The TMDL for E. coli bacteria is due in 2010 and is currently under development. The draft report indicates that the Proctors Creek discharge will receive an E. coli wasteload allocation of 4.70E+13 cfu/year.

The James River is currently under a VDH Fish Consumption Restriction due to PCBs in fish tissue. The current advisory extends from the I-95 bridge downstream to the Hampton Roads Bridge Tunnel and includes the tidal portions of several tributaries. The TMDL is due in 2014. In addition, the James River and its tidal tributaries are considered fully supporting with observed effects for the Fish Consumption Use due to the VDH Fish Consumption Advisory related to kepone.

The Wildlife Use is considered fully supporting.

The James River has historically been considered a Tier 1 water. The Richmond-Crater Water Quality Management Plan allows the dissolved oxygen in the river to be depressed to 5.0 mg/L. In addition, the segment is failing the Aquatic Life Use due to inadequate SAV acreage and high chlorophyll a.

If you have any questions concerning this analysis, please let me know.

2008 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: James River

TMDL ID: G01E-01-BAC **2008 IMPAIRED AREA ID:** CB-JMSTFU

ASSESSMENT CATEGORY: 5A

TMDL DUE DATE: 2010

IMPAIRED SIZE: 6.749 - Sq. Mi.

Watershed: VAP-G01E

INITIAL LISTING: 1996

UPSTREAM LIMIT:

DESCRIPTION: Fall Line (Mayos Bridge)

DOWNSTREAM LIMIT:

DESCRIPTION: Appomattox River

Estuarine James River from the fall line at Mayos Bridge downstream to the Appomattox River.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Recreation Use - Not Supporting

IMPAIRMENT: E.coli

The James River from the fall line to the Appomattox River has been assessed as not supporting of the Recreation use support goal based on the results of a summer special study in the fall zone. The special study was designed to monitor the effects of summertime rain and combined sewer overflow (CSO) events on water quality in the James River and to monitor the effects of Richmond's CSO abatement efforts.

The segment has been included on the Impaired Waters list for fecal coliform since 1996. During the 2004 and 2006 cycles, the bacteria standard changed to E.coli for those stations with enough data. Some of the areas in this segment had converted to the E.coli standard, for others the fecal coliform standard was still in effect. During the 2008 cycle, the impairment was converted solely to E. coli. The TMDL for bacteria is due in 2010.

Bacteria impairment is noted at the following stations:

2-JMS109.39
2-JMS107.51
2-JMS104.46
2-JMS099.30
2-JMS087.01

IMPAIRMENT SOURCE NPS - Urban, CSO

The source of the impairment in this section of the river is believed to be urban runoff from the tributary drainage basin and from combined sewer overflow events from the City of Richmond's combined sewer system.

The City is currently undertaking CSO abatement efforts. It is recommended that the ongoing CSO special study be continued to gauge the effects of CSO abatement efforts on water quality in this segment.

RECOMMENDATION: Problem Characterization

2008 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: James River

TMDL ID: G01E-02-CHLA

2008 IMPAIRED AREA ID: CB-JMSTFU

ASSESSMENT CATEGORY: 5A

TMDL DUE DATE: 2010

IMPAIRED SIZE: 6.003 - Sq. Mi.

Watershed: VAP-G01E

INITIAL LISTING: 2008

UPSTREAM LIMIT:

DESCRIPTION: Fall Line (Mayos Bridge)

DOWNSUMMER LIMIT:

DESCRIPTION: Appomattox River

Mainstem James River from the fall line at Mayos Bridge downstream to the JMSTFU/JMSTFI boundary at the Appomattox River.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting, Open Water Subuse - Not Supporting

IMPAIRMENT: Chlorophyll

The James River from the Appomattox River to the Chickahominy River was originally listed on the 1998 list as fully supporting but threatened of the Aquatic Life Use goal based on chlorophyll a violations. During the 1998 cycle, EPA extended the segment upstream to the fall line and downgraded the river to not supporting the Aquatic Life Use, citing nutrient concerns.

In previous cycles, the mainstem James River had acceptable dissolved oxygen levels. In addition the entire tidal freshwater portion (fall line to just above the Chickahominy River) has good benthic community based on the results from the Chesapeake Bay Benthic Index of Biological Community; therefore the James River from the fall line to the oligohaline boundary was considered impaired solely for Nutrients/Eutrophication Biological Indicators (EPA Overlist).

A special site-specific chlorophyll standard for the mainstem James River was adopted during the 2008 cycle. The upper tidal freshwater segment exceeded both the spring and summer seasonal means.

IMPAIRMENT SOURCE Point sources, Nonpoint Sources

The James River Tributary Strategy was developed to bring the river into attainment.

RECOMMENDATION: Problem Characterization

2008 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: James River and Various Tributaries

TMDL ID: G01E-03-PCB **2008 IMPAIRED AREA ID:** CB-JMSTFU

ASSESSMENT CATEGORY: 5A

TMDL DUE DATE: 2014

IMPAIRED SIZE: ~325 - Stream miles

Watershed: VAP-G01E

INITIAL LISTING: 2002

UPSTREAM LIMIT:

DESCRIPTION: Fall line

DOWNTSTREAM LIMIT:

DESCRIPTION: Hampton Roads Bridge Tunnel

Estuarine James River from the fall line to the Hampton Roads Bridge Tunnel, including several tributaries listed below.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Fish Consumption Use - Not Supporting

IMPAIRMENT: Fish Tissue - PCBs, VDH Fish Consumption Restriction

During the 2002 cycle, the James River from the Fall line to Queens Creek was considered not supporting of the Fish Consumption Use due to PCBs in multiple fish species at multiple DEQ monitoring locations.

During the 2004 cycle, a VDH Fish Consumption Restriction was issued from the fall line to Flowerdew Hundred and the segment was adjusted slightly to match the Restriction. In addition, In the 2004 cycle, the Chickahominy River from Walkers Dam to Diascund Creek was assessed as not supporting the Fish Consumption Use because the DEQ screening value for PCBs was exceeded in 3 species during sampling in 2001.

During the 2006 cycle, the VDH restriction was extended on 12/13/2004 to extend from the I-95 bridge downstream to the Hampton Roads Bridge Tunnel and include the tidal portions of the following tributaries:

Appomattox River up to Lake Chedlin Dam

Bailey Creek up to Route 630

Bailey Bay

Chickahominy River up to Walkers Dam

Skiffes Creek up to Skiffes Creek Dam

Pagan River and its tributary Jones Creek

Chuckatuck Creek

Nansemond River and its tributaries Bennett Creek and Star Creek

Hampton River

Willoughby Bay and the Elizabeth R. system (Western, Eastern, and Southern Branches and Lafayette R.) and tributaries St. Julian Creek, Deep Creek, and Broad Creek

The advisory was modified again on 10/10/2006 to add Poythress Run.

The impairments were combined. The TMDL for the lower extended portion is due in 2018.

IMPAIRMENT SOURCE Unknown

The source of the PCBs is considered unknown.

RECOMMENDATION: Toxic Source Assessment

2008 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: James River Tidal Freshwater (Upper) Estuary

TMDL ID: JMSTFU-SAV-BAY **2008 IMPAIRED AREA ID:** CB-JMSTFU

ASSESSMENT CATEGORY: 5A

TMDL DUE DATE: 2010

IMPAIRED SIZE: 7.726 - Sq. Mi.

Watershed: VAP-G03E

INITIAL LISTING: 1998

UPSTREAM LIMIT:

DESCRIPTION: Fall line

DOWNSTREAM LIMIT:

DESCRIPTION: Tidal Freshwater/Oligohaline Boundary

The James River Tidal Freshwater Upper estuary, which extends from the fall line to approximately the Appomattox River, including tributaries.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting, Shallow Water Use - Not Supporting

IMPAIRMENT: Aquatic Macrophytes

The mainstem James River from the Appomattox River to the Chickahominy River was originally listed on the 1998 list as fully supporting but threatened of the Aquatic Life Use goal based on chlorophyll a violations. During the 1998 cycle, EPA extended the segment upstream to the fall line and downgraded the river to not supporting the Aquatic Life Use, citing nutrient concerns.

In previous cycles, the mainstem James River had acceptable dissolved oxygen levels. In addition the entire tidal freshwater portion (fall line to just above the Chickahominy River) has good benthic community based on the results from the Chesapeake Bay Benthic Index of Biological Community; therefore the James River from the fall line to the oligohaline boundary was considered impaired solely for Nutrients/Eutrophication Biological Indicators (EPA Overlist).

During the 2006 cycle, the CB water quality standards were implemented. The Upper Tidal Freshwater James River from the fall line to the Appomattox failed the Shallow Water Use SAV criteria. The 30-day Open Water dissolved oxygen criteria were acceptable, but there was insufficient information to assess the other OW criteria or the Migratory Spawning Use.

IMPAIRMENT SOURCE Nonpoint Source, Point Source

The tributary strategy for the James River assigned sources and allocations.

RECOMMENDATION: Tributary Strategy Implementation

Fact Sheet Proctors Creek WWTP						00900
						HARDNESS, TOTAL (MG/L AS CACO3)
Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	Value	Com Code
2-JMS099.30	06/18/1992 16:50	S	0.3	R	68.0	
2-JMS099.30	07/20/1992 15:30	S	0.3	R	82.0	
2-JMS099.30	09/01/1992 14:35	S	0.3	R	88.0	
2-JMS099.30	11/17/1992 14:48	S	0.3	R	62.0	
2-JMS099.30	12/15/1992 15:25	S	0.3	R	33.0	
2-JMS099.30	01/14/1993 14:50	S	0.3	R	46.0	
2-JMS099.30	02/09/1993 14:15	S	0.3	R	58.0	
2-JMS099.30	08/18/1993 14:10	S	0.3	R	70.0	
2-JMS099.30	09/20/1993 14:15	S	0.3	R	98.0	
2-JMS099.30	10/05/1993 14:20	S	0.3	R	96.0	
2-JMS099.30	11/17/1993 14:00	S	0.3	R	94.0	
2-JMS099.30	12/02/1993 15:05	S	0.3	R	56.0	
2-JMS099.30	02/17/1994 15:35	S	1	R	42.0	
2-JMS099.30	03/21/1994 14:55	B	10	R	54.0	
2-JMS099.30	03/21/1994 14:55	S	1	R	54.0	
2-JMS099.30	04/14/1994 15:20	S	1	R	53.0	
2-JMS099.30	05/23/1994 16:05	S	1	R	68.0	
2-JMS099.30	06/09/1994 15:15	S	1	R	72.0	
2-JMS099.30	09/08/1994 15:00	S	1	R	75.0	
2-JMS099.30	10/17/1994 15:45	S	1	R	87.0	
2-JMS099.30	11/30/1994 15:15	S	1	R	75.0	
2-JMS099.30	12/06/1994 15:55	S	1	R	75.0	
2-JMS099.30	01/25/1995 15:05	S	1	R	55.0	
2-JMS099.30	02/27/1995 15:05	S	1	R	60.0	
2-JMS099.30	03/23/1995 15:50	S	1	R	58.0	
2-JMS099.30	04/18/1995 15:30	S	1	R	67.0	
2-JMS099.30	05/23/1995 15:10	S	1	R	45.0	
2-JMS099.30	06/20/1995 15:40	S	1	R	59.0	
2-JMS099.30	07/18/1995 15:25	S	1	R	66.0	
2-JMS099.30	08/23/1995 16:00	S	1	R	90.0	
2-JMS099.30	09/21/1995 14:45	S	1	R	115.0	
2-JMS099.30	10/19/1995 15:25	S	1	R	74.0	
2-JMS099.30	11/20/1995 15:35	S	1	R	73.0	
2-JMS099.30	12/14/1995 16:00	S	1	R	48.0	
2-JMS099.30	01/29/1996 15:30	S	1	R	28.0	
2-JMS099.30	02/20/1996 15:10	S	1	R	56.0	
2-JMS099.30	03/25/1996 15:10	S	1	R	60.0	
2-JMS099.30	04/29/1996 11:20	S	1	R	61.0	
2-JMS099.30	05/15/1996 14:35	S	1	R	56.0	
2-JMS099.30	06/18/1996 14:50	S	1	R	50.0	
2-JMS099.30	07/23/1996 15:35	S	1	R	70.0	
2-JMS099.30	08/20/1996 14:50	S	1	R	89.0	
2-JMS099.30	09/24/1996 14:55	S	1	R	64.0	
2-JMS099.30	10/22/1996 14:30	S	1	R	51.0	
2-JMS099.30	11/19/1996 15:15	S	1	R	61.0	
2-JMS099.30	12/10/1996 15:25	S	1	R	41.0	
2-JMS099.30	02/18/1997 15:50	S	1	R	43.3	
2-JMS099.30	03/18/1997 15:20	S	1	R	54.0	
2-JMS099.30	04/22/1997 15:25	S	1	R	79.9	
2-JMS099.30	05/28/1997 16:00	S	1	R	62.2	
2-JMS099.30	06/24/1997 15:30	S	1	R	66.1	
2-JMS099.30	07/15/1997 15:30	S	1	R	79.4	
2-JMS099.30	08/19/1997 15:10	S	1	R	62.6	
2-JMS099.30	09/23/1997 15:05	S	1	R	75.7	

Fact Sheet Proctors Creek WWTP						00900
						HARDNESS, TOTAL (MG/L AS CACO3)
Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	Value	Com Code
2-JMS099.30	10/21/1997 15:00	S	1	R	79.1	
2-JMS099.30	11/18/1997 15:15	S	1	R	68.3	
2-JMS099.30	12/10/1997 15:45	S	1	R	74.3	
2-JMS099.30	01/21/1998 15:45	S	1	R	46.8	
2-JMS099.30	02/18/1998 15:00	S	1	R	40.8	
2-JMS099.30	03/17/1998 15:30	S	1	R	44.1	
2-JMS099.30	04/21/1998 15:20	S	1	R	35.1	
2-JMS099.30	05/19/1998 15:25	S	1	R	47.1	
2-JMS099.30	06/23/1998 16:05	S	1	R	64.4	
2-JMS099.30	07/21/1998 15:15	S	1	R	69.6	
2-JMS099.30	08/18/1998 15:25	S	1	R	77.5	
2-JMS099.30	09/22/1998 17:30	S	1	R	89.3	
2-JMS099.30	10/20/1998 16:30	S	1	R	126.0	
2-JMS099.30	11/18/1998 15:15	S	1	R	102.0	
2-JMS099.30	12/15/1998 15:30	S	1	R	90.0	
2-JMS099.30	01/19/1999 15:20	S	1	R	76.0	
2-JMS099.30	02/23/1999 15:10	S	1	R	60.0	
2-JMS099.30	03/23/1999 15:30	S	1	R	68.0	
2-JMS099.30	04/20/1999 16:35	S	1	R	84.0	
2-JMS099.30	05/20/1999 15:20	S	1	R	60.0	
2-JMS099.30	06/22/1999 15:15	S	1	R	80.1	
2-JMS099.30	07/20/1999 16:15	S	1	R	96.0	
2-JMS099.30	08/17/1999 16:00	S	1	R	109.0	
2-JMS099.30	09/21/1999 16:20	S	1	R	40.9	
2-JMS099.30	10/28/1999 15:10	S	1	R	74.6	
2-JMS099.30	11/18/1999 15:27	S	1	R	62.7	
2-JMS099.30	12/21/1999 15:05	S	1	R	54.1	
2-JMS099.30	01/18/2000 16:15	S	1	S1	55.8	
2-JMS099.30	02/23/2000 14:15	S	1	R	54.0	
2-JMS099.30	03/28/2000 15:30	S	1	S1	43.0	
2-JMS099.30	04/24/2000 15:55	S	1	R	40.0	
2-JMS099.30	05/23/2000 17:20	S	1	R	57.0	
2-JMS099.30	06/20/2000 16:05	S	1	R	65.6	
2-JMS099.30	07/18/2000 16:35	S	1	R	76.0	
2-JMS099.30	08/22/2000 15:20	S	1	R	76.4	
2-JMS099.30	09/26/2000 16:20	S	1	R	65.1	
2-JMS099.30	10/24/2000 15:20	S	1	R	86.9	
2-JMS099.30	11/28/2000 16:50	S	1	R	123.0	
2-JMS099.30	01/23/2001 14:00	S	1	R	47.8	
2-JMS099.30	02/20/2001 13:20	S	1	R	58.9	
2-JMS099.30	03/27/2001 15:00	S	1	R	25.1	
2-JMS099.30	04/24/2001 13:50	S	1	R	47.2	
2-JMS099.30	06/19/2001 14:30	S	1	R	30.9	
2-JMS099.30	07/24/2001 14:40	S	1	R	77.8	
2-JMS099.30	08/21/2001 15:20	S	1	R	62.6	
2-JMS099.30	09/18/2001 16:20	S	1	R	28.3	
2-JMS099.30	10/16/2001 15:00	S	1	S1	200.6	
2-JMS099.30	11/27/2001 15:30	S	1	R	132.0	
2-JMS099.30	12/12/2001 14:50	S	1	R	137.0	
2-JMS099.30	01/22/2002 15:25	S	1	R	78.8	
2-JMS099.30	02/19/2002 15:15	S	1	R	54.0	
2-JMS099.30	03/19/2002 15:30	S	1	R	37.3	
2-JMS099.30	04/16/2002 15:40	S	1	R	57.9	
2-JMS099.30	05/30/2002 16:20	S	1	R	68.0	

Fact Sheet Proctors Creek WWTP						00900
						HARDNESS, TOTAL (MG/L AS CACO3)
Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	Value	Com Code
2-JMS099.30	06/25/2002 15:20	S	1	R	94.2	
2-JMS099.30	07/23/2002 15:00	S	1	R	124.0	
2-JMS099.30	08/13/2002 15:40	S	1	R	151.0	
2-JMS099.30	09/24/2002 15:40	S	1	R	95.5	
2-JMS099.30	10/22/2002 15:50	S	1	R	121.0	
2-JMS099.30	11/19/2002 16:10	S	1	R	30.5	
2-JMS099.30	12/10/2002 15:15	S	1	R	34.8	
2-JMS099.30	01/21/2003 15:45	S	1	R	67.9	
2-JMS099.30	02/25/2003 11:13	S	1	R	51.3	
2-JMS099.30	03/18/2003 15:40	S	1	R	48.8	
2-JMS099.30	04/15/2003 17:00	S	1	R	47.0	
2-JMS099.30	05/27/2003 14:19	S	1	R	43.8	
2-JMS099.30	06/24/2003 14:50	S	1	R	58.7	
2-JMS099.30	07/15/2003 15:00	S	1	R	48.8	
2-JMS099.30	08/26/2003 16:00	S	1	R	52.8	
2-JMS099.30	09/24/2003 15:37	S	1	R	24.9	
2-JMS099.30	10/28/2003 15:30	S	1	R	72.8	
2-JMS099.30	11/18/2003 15:00	S	1	R	50.0	
2-JMS099.30	12/16/2003 15:00	S	1	R	42.0	
2-JMS099.30	02/25/2004 15:00	S	1	R	56.4	
2-JMS099.30	03/23/2004 15:20	S	1	R	62.9	
2-JMS099.30	04/20/2004 14:40	S	1	R	51.0	
2-JMS099.30	05/18/2004 15:00	S	1	R	60.0	
2-JMS099.30	06/15/2004 15:00	S	1	R	51.0	
2-JMS099.30	07/20/2004 14:45	S	1	R	66.9	
2-JMS099.30	08/17/2004 15:00	S	1	R	45.5	
2-JMS099.30	09/21/2004 14:45	S	1	R	47.8	
2-JMS099.30	10/19/2004 14:20	S	1	R	36.0	
2-JMS099.30	11/16/2004 14:45	S	1	R	43.0	
2-JMS099.30	12/14/2004 15:25	S	1	R	57.0	
2-JMS099.30	01/26/2005 15:00	S	1	R	56.0	
2-JMS099.30	02/15/2005 14:40	S	1	R	72.0	
2-JMS099.30	03/22/2005 15:15	S	1	R	60.0	
2-JMS099.30	04/19/2005 15:40	S	1	R	54.7	
2-JMS099.30	05/24/2005 14:45	S	1	R	46.0	
2-JMS099.30	06/21/2005 14:50	S	1	R	74.0	
2-JMS099.30	07/19/2005 15:00	S	1	R	76.0	
2-JMS099.30	08/23/2005 15:30	S	1	R	74.0	
2-JMS099.30	09/20/2005 15:00	S	1	R	114.0	
2-JMS099.30	10/18/2005 15:20	S	1	R	56.0	
2-JMS099.30	11/15/2005 14:30	S	1	R	94.0	
2-JMS099.30	12/21/2005 15:00	S	1	R	53.0	
2-JMS099.30	01/17/2006 14:45	S	1	S1	69.0	
2-JMS099.30	02/21/2006 15:10	S	1	R	59.0	
2-JMS099.30	03/20/2006 15:15	S	1	R	72.0	
2-JMS099.30	04/26/2006 15:00	S	1	R	52.0	
2-JMS099.30	05/15/2006 15:00	S	1	R	62.0	
2-JMS099.30	07/24/2006 14:25	S	1	R	78.0	
2-JMS099.30	08/22/2006 15:00	S	1	R	88.0	
2-JMS099.30	10/30/2006 15:10	S	1	R	52.0	
2-JMS099.30	11/15/2006 14:30	S	1	R	38.0	
2-JMS099.30	01/24/2007 14:45	S	1	R	58.0	
Average					66.4	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	7/22/1968	S	.30	30.00	7.00			3.80
2-JMS099.30	9/8/1968	S	.30	27.22	7.00			3.90
2-JMS099.30	3/20/1969	S	.30	10.00	7.20			8.80
2-JMS099.30	6/19/1969	S	.30	25.56	6.30			4.70
2-JMS099.30	10/2/1969	S	.30	21.11	7.30			3.60
2-JMS099.30	4/21/1970	S	.30	17.78	7.30			6.80
2-JMS099.30	5/5/1970	S	.30	20.00	6.90			7.60
2-JMS099.30	6/18/1970	S	.30	28.33	6.80			4.40
2-JMS099.30	7/2/1970	S	.30	28.89				3.80
2-JMS099.30	7/22/1970	S	.30	27.78	7.20			1.60
2-JMS099.30	8/15/1970	S	.30	31.11	7.30			3.60
2-JMS099.30	8/26/1970	S	.30	28.89	6.90			3.20
2-JMS099.30	9/9/1970	S	.30	29.44				4.20
2-JMS099.30	5/6/1971	S	.30	17.22	7.30			6.20
2-JMS099.30	6/13/1971	S	.30	23.33	7.30			6.00
2-JMS099.30	7/5/1971	S	.30	28.89	8.60			8.20
2-JMS099.30	7/23/1971	S	.30	28.33	7.50			4.00
2-JMS099.30	8/3/1971	S	.30	29.44	7.30			5.00
2-JMS099.30	8/31/1971	S	.30	26.11	6.70			6.40
2-JMS099.30	9/26/1971	S	.30	23.89	7.50			6.40
2-JMS099.30	10/27/1971	S	.30	18.89	7.00			9.00
2-JMS099.30	5/2/1972	S	.30	20.56	7.30			6.00
2-JMS099.30	7/8/1972	S	.30	21.11	7.40			8.40
2-JMS099.30	7/31/1972	S	.30	25.00				8.40
2-JMS099.30	8/9/1972	S	.30	26.67	7.70			6.80
2-JMS099.30	8/20/1972	S	.30		7.00			6.00
2-JMS099.30	9/5/1972	S	.30	25.56	7.00			7.20
2-JMS099.30	10/4/1972	S	.30	21.11	7.70			7.00
2-JMS099.30	5/3/1973	S	.30	17.78	7.00			8.30
2-JMS099.30	6/6/1973	S	.30	26.11	7.80			7.00
2-JMS099.30	6/9/1973	S	.30	28.89	7.90			11.79
2-JMS099.30	7/15/1973	S	.30	28.33	7.30			4.00
2-JMS099.30	9/29/1973	S	.30	29.44	7.00			3.60
2-JMS099.30	8/30/1974	S	.30	28.00	7.50			7.00
2-JMS099.30	9/26/1974	S	.30	21.00	7.50			7.20
2-JMS099.30	10/25/1974	S	.30	15.00	8.00			11.19
2-JMS099.30	5/1/1975	S	.30	17.22	7.30			9.10
2-JMS099.30	6/4/1975	S	.30		7.30			7.90
2-JMS099.30	6/24/1975	S	.30	28.33	8.00			8.00
2-JMS099.30	6/30/1975	S	.30	26.67	7.50			7.80
2-JMS099.30	7/28/1975	S	.30	27.78	8.00			7.60
2-JMS099.30	8/13/1975	S	.30	27.78	7.50			7.00
2-JMS099.30	8/16/1975	S	.30	30.00	7.70			7.80
2-JMS099.30	9/3/1975	S	.30	23.89	7.40			7.70
2-JMS099.30	10/1/1975	S	.30	20.00	7.50			9.20
2-JMS099.30	2/12/1976	S	.30	5.56	7.50			12.69
2-JMS099.30	3/11/1976	S	.30	10.00	7.50			10.00
2-JMS099.30	5/4/1976	S	.30	20.00	7.50			8.40
2-JMS099.30	6/7/1976	S	.30	22.22	7.20			8.10
2-JMS099.30	5/22/1978	S	.30	20.00	8.00			9.00
2-JMS099.30	6/15/1978	S	.30	25.00	9.00			4.70
2-JMS099.30	7/11/1978	S	.30	8.00	8.00			6.10
2-JMS099.30	8/3/1978	S	.30	5.00	7.00			5.50
2-JMS099.30	9/25/1978	S	.30	26.00	8.50			7.10
2-JMS099.30	12/12/1978	S	.30	8.00	7.50			11.70
2-JMS099.30	4/24/1979	S	.30	19.00	7.70			8.70
2-JMS099.30	5/19/1980	S	.30	21.00	8.30			8.30
2-JMS099.30	7/16/1980	S	.30	28.50	8.30			7.00
2-JMS099.30	10/20/1980	S	.30	18.00	8.00			7.70
2-JMS099.30	7/27/1981	S	.30	29.00	8.70			7.80
2-JMS099.30	9/8/1981	S	.30	26.00	7.80			7.00
2-JMS099.30	11/16/1981	S	.30	11.00	7.20			6.90

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	5/13/1982	S	.30	21.50	8.70			7.20
2-JMS099.30	6/24/1982	S	.30	25.00	7.50			7.00
2-JMS099.30	8/9/1982	S	.30	28.00	7.20			5.50
2-JMS099.30	10/28/1982	S	.30					
2-JMS099.30	11/18/1982	S	.30	9.00	6.90			10.60
2-JMS099.30	5/17/1983	S	.30	19.50	7.90			8.50
2-JMS099.30	6/28/1983	S	.30	28.50	7.00			7.10
2-JMS099.30	8/30/1983	S	2.74					
2-JMS099.30	8/30/1983	B	32.92					
2-JMS099.30	9/20/1983	S	.91	26.50	7.60			8.00
2-JMS099.30	9/20/1983	M	2.74					
2-JMS099.30	9/20/1983	B	42.98					
2-JMS099.30	10/3/1983	S	.91	20.00	7.80			7.30
2-JMS099.30	10/3/1983	M	2.74					
2-JMS099.30	10/3/1983	B	31.70					
2-JMS099.30	10/12/1983	S	.91					
2-JMS099.30	7/12/1984	S	1.00	26.00	6.90	7.60		
2-JMS099.30	7/31/1984	S	11.00	24.50		7.20	.00	
2-JMS099.30	7/31/1984	S	1.00	24.50	7.30	7.30	.00	
2-JMS099.30	8/15/1984	S	11.00	24.00	6.80	8.60		
2-JMS099.30	8/15/1984	S	1.00	24.00	7.00	8.60		
2-JMS099.30	9/12/1984	S	1.00	24.00	7.80	7.60		
2-JMS099.30	9/12/1984	B	11.00	23.50	7.70	7.20		
2-JMS099.30	9/25/1984	S	1.00	23.50		7.10		
2-JMS099.30	9/25/1984	B	12.00	23.50		7.40		
2-JMS099.30	10/11/1984	S	3.00	19.50		8.30	.00	
2-JMS099.30	10/11/1984	M	5.00	19.50		8.30	.00	
2-JMS099.30	10/11/1984	M	7.00	19.00		8.30	.00	
2-JMS099.30	10/11/1984	M	9.00	19.00		8.30	.00	
2-JMS099.30	10/11/1984	B	10.00	19.00	6.60	8.30	.00	
2-JMS099.30	10/11/1984	S	1.00	19.50	7.00	8.30	.00	
2-JMS099.30	10/18/1984	S	1.00	19.50	7.20	8.50		
2-JMS099.30	10/18/1984	B	12.00	19.50	7.20	8.40		
2-JMS099.30	11/2/1984	S	1.00	20.50	7.10	7.90	.00	
2-JMS099.30	11/2/1984	M	3.00	20.50		7.80	.00	
2-JMS099.30	11/2/1984	M	5.00	20.50		7.80	.00	
2-JMS099.30	11/2/1984	M	7.00	20.50		7.80	.00	
2-JMS099.30	11/2/1984	B	9.00	20.50	6.80	7.70	.00	
2-JMS099.30	11/16/1984	S	1.00	11.00	7.60	11.00	.00	
2-JMS099.30	11/16/1984	M	3.00	11.00		11.00	.00	
2-JMS099.30	11/16/1984	M	5.00	11.00		11.00	.00	
2-JMS099.30	11/16/1984	M	7.00	11.00		11.00	.00	
2-JMS099.30	11/16/1984	M	9.00	11.00		11.00	.00	
2-JMS099.30	11/16/1984	B	11.00	11.00	7.50	11.00	.00	
2-JMS099.30	12/12/1984	S	1.00	5.00	6.90	12.00	.20	
2-JMS099.30	12/12/1984	M	3.00	5.00		12.00	.20	
2-JMS099.30	12/12/1984	M	5.00	5.00		12.00	.20	
2-JMS099.30	12/12/1984	M	7.00	5.00		12.00	.20	
2-JMS099.30	12/12/1984	B	9.00	5.00	6.90	12.10	.20	
2-JMS099.30	2/4/1985	S	1.00	1.50	6.60	14.40	.00	
2-JMS099.30	2/4/1985	M	3.00	1.50		14.40	.00	
2-JMS099.30	2/4/1985	M	5.00	1.50		14.40	.00	
2-JMS099.30	2/4/1985	M	7.00	2.00		14.40	.00	
2-JMS099.30	2/4/1985	M	9.00	2.00		14.40	.00	
2-JMS099.30	2/4/1985	M	11.00	2.00		14.40	.00	
2-JMS099.30	2/4/1985	B	13.00	2.00	7.00	14.40	.00	
2-JMS099.30	3/11/1985	S	1.00	10.00	6.90	11.60		11.20
2-JMS099.30	3/11/1985	M	3.00	10.00		11.50	.10	
2-JMS099.30	3/11/1985	M	5.00	10.00		11.40	.10	
2-JMS099.30	3/11/1985	M	7.00	10.00		11.40	.10	
2-JMS099.30	3/11/1985	M	9.00	10.00		11.40	.10	
2-JMS099.30	3/11/1985	B	11.00	10.00	6.80	11.30	.10	11.10

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	3/27/1985	S	1.00	10.50	7.40	11.00	.00	
2-JMS099.30	3/27/1985	M	3.00	10.50		11.00	.00	
2-JMS099.30	3/27/1985	M	5.00	10.50		11.00	.00	
2-JMS099.30	3/27/1985	M	7.00	10.50		10.90	.00	
2-JMS099.30	3/27/1985	M	9.00	10.50		10.90	.00	
2-JMS099.30	3/27/1985	B	11.00	10.50	7.60	10.90	.00	10.90
2-JMS099.30	4/10/1985	S	1.00	12.00	7.50	10.00	.00	9.70
2-JMS099.30	4/10/1985	M	3.00	12.00		10.00	.00	
2-JMS099.30	4/10/1985	M	5.00	12.00		10.00	.00	
2-JMS099.30	4/10/1985	M	7.00	12.00		10.00	.00	
2-JMS099.30	4/10/1985	M	9.00	12.00		10.10	.00	
2-JMS099.30	4/10/1985	B	10.00	12.00	7.30	10.10	.00	9.70
2-JMS099.30	4/24/1985	S	1.00	23.00	7.40	6.30	.00	7.80
2-JMS099.30	4/24/1985	M	3.00	23.00		6.30	.00	
2-JMS099.30	4/24/1985	M	5.00	23.00		6.30	.00	
2-JMS099.30	4/24/1985	M	7.00	23.00		6.30	.00	
2-JMS099.30	4/24/1985	M	9.00	23.00		6.20	.00	
2-JMS099.30	4/24/1985	B	11.00	23.00	7.30	6.20	.00	5.90
2-JMS099.30	5/8/1985	S	1.00	21.50	7.40	8.20	.00	7.80
2-JMS099.30	5/8/1985	M	3.00	21.50		8.10	.00	
2-JMS099.30	5/8/1985	M	5.00	21.50		8.10	.00	
2-JMS099.30	5/8/1985	M	7.00	21.50		8.10	.00	
2-JMS099.30	5/8/1985	M	9.00	21.00		8.10	.00	
2-JMS099.30	5/8/1985	M	11.00	21.00		8.10	.00	
2-JMS099.30	5/8/1985	B	12.00	21.00	7.30	7.90	.00	7.70
2-JMS099.30	5/22/1985	S	1.00	22.00	7.30	7.70	.00	7.20
2-JMS099.30	5/22/1985	M	3.00	22.00		7.60	.00	
2-JMS099.30	5/22/1985	M	5.00	22.00		7.60	.00	
2-JMS099.30	5/22/1985	M	7.00	22.00		7.60	.00	
2-JMS099.30	5/22/1985	M	9.00	22.00		7.60	.00	
2-JMS099.30	5/22/1985	B	11.00	22.00	7.20	7.60	.00	7.50
2-JMS099.30	6/19/1985	S	1.00	23.50	7.80	7.20	.00	7.70
2-JMS099.30	6/19/1985	M	5.00	23.50		7.20	.00	
2-JMS099.30	6/19/1985	M	7.00	23.50		7.20	.00	
2-JMS099.30	6/19/1985	M	9.00	23.50		7.10	.00	
2-JMS099.30	6/19/1985	B	11.00	23.50	7.57	7.10	.00	7.80
2-JMS099.30	7/2/1985	S	1.00	24.00	7.82	6.20	.10	
2-JMS099.30	7/2/1985	M	3.00	24.00		6.20	.10	
2-JMS099.30	7/2/1985	M	5.00	24.00		6.20	.10	
2-JMS099.30	7/2/1985	M	7.00	24.00		6.20	.10	
2-JMS099.30	7/2/1985	M	9.00	24.00		6.20	.10	
2-JMS099.30	7/2/1985	M	11.00	24.00		6.20	.10	
2-JMS099.30	7/2/1985	B	12.00	24.00	7.84	6.20	.10	5.60
2-JMS099.30	7/17/1985	S	1.00	26.00	7.57	6.40	.00	6.30
2-JMS099.30	7/17/1985	M	3.00	26.00		6.30	.00	
2-JMS099.30	7/17/1985	M	5.00	26.00		6.30	.00	
2-JMS099.30	7/17/1985	M	7.00	26.00		6.30	.00	
2-JMS099.30	7/17/1985	M	9.00	26.00		6.30	.00	
2-JMS099.30	7/17/1985	M	11.00	26.00		6.20	.00	
2-JMS099.30	7/17/1985	B	12.00	26.00	7.40	6.20	.00	5.80
2-JMS099.30	8/5/1985	S	1.00	24.50	7.56	6.30	.00	
2-JMS099.30	8/5/1985	M	3.00	24.50		6.20	.00	
2-JMS099.30	8/5/1985	M	5.00	24.50		6.20	.00	
2-JMS099.30	8/5/1985	M	7.00	24.50		6.20	.00	
2-JMS099.30	8/5/1985	M	9.00	24.50		6.10	.00	
2-JMS099.30	8/5/1985	B	11.00	24.50	7.78	6.10	.00	
2-JMS099.30	8/15/1985	S	1.00	28.50	8.07	8.20	.00	
2-JMS099.30	8/15/1985	M	3.00	28.00		7.20	.00	
2-JMS099.30	8/15/1985	M	5.00	27.50		2.10	.00	
2-JMS099.30	8/15/1985	M	7.00	27.50		7.10	.00	
2-JMS099.30	8/15/1985	M	9.00	27.00		6.40	.00	
2-JMS099.30	8/15/1985	M	11.00	27.00		6.10	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	8/15/1985	B	13.00	27.00	7.56	6.10		
2-JMS099.30	9/4/1985	S	3.00	25.00		7.30	.00	
2-JMS099.30	9/4/1985	B	11.00	23.00		7.20	.00	
2-JMS099.30	9/4/1985	S	1.00	25.00	7.61	7.60	.00	6.70
2-JMS099.30	9/4/1985	M	5.00	23.00		7.30	.00	
2-JMS099.30	9/4/1985	M	7.00	23.00		7.30	.00	
2-JMS099.30	9/4/1985	M	9.00	23.00		7.20	.00	
2-JMS099.30	9/4/1985	M	11.00	23.00		7.20	.00	
2-JMS099.30	9/4/1985	B	12.00	23.00	7.57	7.10	.00	6.30
2-JMS099.30	9/17/1985	S	1.00	21.00	7.86	7.60	.00	
2-JMS099.30	9/17/1985	M	3.00	20.50		7.70	.00	
2-JMS099.30	9/17/1985	M	5.00	20.50		7.70	.00	
2-JMS099.30	9/17/1985	M	7.00	20.50		7.60	.00	
2-JMS099.30	9/17/1985	M	9.00	20.50		7.60	.00	
2-JMS099.30	9/17/1985	B	11.00	20.50	7.93	7.60	.00	
2-JMS099.30	10/2/1985	S	1.00	22.00	7.51	6.80	.00	6.80
2-JMS099.30	10/2/1985	M	3.00	21.50		6.70	.00	
2-JMS099.30	10/2/1985	M	5.00	21.50		6.70	.00	
2-JMS099.30	10/2/1985	M	7.00	21.50		6.70	.00	
2-JMS099.30	10/2/1985	M	9.00	21.50		6.70	.00	
2-JMS099.30	10/2/1985	B	11.00	21.50	7.37	6.70	.00	6.60
2-JMS099.30	10/16/1985	S	1.00	21.00	7.65	6.60	.00	6.20
2-JMS099.30	10/16/1985	M	3.00	20.50		6.50	.00	
2-JMS099.30	10/16/1985	M	5.00	20.00		6.40	.00	
2-JMS099.30	10/16/1985	M	7.00	20.00		6.40	.00	
2-JMS099.30	10/16/1985	M	9.00	20.00		6.40	.00	
2-JMS099.30	10/16/1985	B	11.00	20.00	7.59	6.40	.00	
2-JMS099.30	11/18/1985	S	1.00	14.50	7.92	9.50	.00	8.80
2-JMS099.30	11/18/1985	M	3.00	14.50		9.40	.00	
2-JMS099.30	11/18/1985	M	5.00	14.50		9.50	.00	
2-JMS099.30	11/18/1985	M	7.00	14.50		9.50	.00	
2-JMS099.30	11/18/1985	M	9.00	14.50		9.50	.00	
2-JMS099.30	11/18/1985	B	11.00	14.50	7.90	9.40	.00	8.80
2-JMS099.30	12/4/1985	S	1.00	9.00	7.88	10.80	.00	10.40
2-JMS099.30	12/4/1985	M	3.00	9.00		10.80	.00	
2-JMS099.30	12/4/1985	M	5.00	9.00		10.80	.00	
2-JMS099.30	12/4/1985	M	7.00	9.00		10.70	.00	
2-JMS099.30	12/4/1985	M	9.00	9.00		10.70	.00	
2-JMS099.30	12/4/1985	M	11.00	9.00		10.70	.00	
2-JMS099.30	12/4/1985	B	12.00	9.00	7.86	10.70	.00	10.60
2-JMS099.30	1/15/1986	S	1.00	2.50	7.98	12.50	.00	12.40
2-JMS099.30	1/15/1986	M	3.00	2.50		12.50	.00	
2-JMS099.30	1/15/1986	M	5.00	2.50		12.40	.00	
2-JMS099.30	1/15/1986	M	7.00	2.50		12.40	.00	
2-JMS099.30	1/15/1986	M	9.00	2.50		12.00	.00	
2-JMS099.30	1/15/1986	B	11.00	2.50	7.77	12.20	.00	
2-JMS099.30	2/12/1986	S	1.00	5.00	7.84	11.60	.00	11.40
2-JMS099.30	2/12/1986	M	3.00	5.00		11.50	.00	
2-JMS099.30	2/12/1986	M	5.00	5.00		11.50	.00	
2-JMS099.30	2/12/1986	M	7.00	5.00		11.50	.00	
2-JMS099.30	2/12/1986	M	9.00	5.00		11.50	.00	
2-JMS099.30	2/12/1986	M	11.00	5.00		11.50	.00	
2-JMS099.30	2/12/1986	B	12.00	5.00	7.64	11.40	.00	11.60
2-JMS099.30	3/12/1986	S	1.00	10.00	7.79	10.70	.00	10.00
2-JMS099.30	3/12/1986	M	3.00	10.00		10.70	.00	
2-JMS099.30	3/12/1986	M	5.00	10.00		10.70	.00	
2-JMS099.30	3/12/1986	M	7.00	10.00		10.60	.00	
2-JMS099.30	3/12/1986	M	9.00	10.00		10.60	.00	
2-JMS099.30	3/12/1986	B	11.00	10.00	7.52	10.60	.00	10.00
2-JMS099.30	3/26/1986	S	1.00	12.00	8.08	10.60	.00	10.30
2-JMS099.30	3/26/1986	M	3.00	12.00		10.60	.00	
2-JMS099.30	3/26/1986	M	5.00	12.00		10.50	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	3/26/1986	M	7.00	12.00		10.50	.00	
2-JMS099.30	3/26/1986	M	9.00	12.00		10.50	.00	
2-JMS099.30	3/26/1986	B	11.00	12.00	7.79	10.50	.00	10.40
2-JMS099.30	4/10/1986	S	1.00	16.50	8.18		.00	8.10
2-JMS099.30	4/10/1986	M	3.00	16.50			.00	
2-JMS099.30	4/10/1986	M	5.00	16.50			.00	
2-JMS099.30	4/10/1986	M	7.00	16.50			.00	
2-JMS099.30	4/10/1986	M	9.00	16.50		7.40	.00	
2-JMS099.30	4/10/1986	B	10.00	16.50	8.25	7.40	.00	7.90
2-JMS099.30	4/28/1986	S	1.00	18.00	8.54	7.70	.00	6.90
2-JMS099.30	4/28/1986	M	3.00	18.00		7.60	.00	
2-JMS099.30	4/28/1986	M	5.00	18.00		7.60	.00	
2-JMS099.30	4/28/1986	M	7.00	18.00		7.50	.00	
2-JMS099.30	4/28/1986	M	9.00	18.00		7.40	.00	
2-JMS099.30	4/28/1986	M	11.00	18.00		7.40	.00	
2-JMS099.30	4/28/1986	B	12.00	18.00	8.70	7.40		7.20
2-JMS099.30	5/8/1986	S	1.00	22.00	7.70	6.50	.00	7.30
2-JMS099.30	5/8/1986	M	3.00	22.00		6.40	.00	
2-JMS099.30	5/8/1986	M	5.00	22.00		6.40	.00	
2-JMS099.30	5/8/1986	M	7.00	22.00		6.30	.00	
2-JMS099.30	5/8/1986	B	9.00	22.00	7.31	5.90	.00	6.60
2-JMS099.30	5/27/1986	S	1.00	22.50	7.97	7.80	.00	7.10
2-JMS099.30	5/27/1986	M	3.00	22.00		7.70	.00	
2-JMS099.30	5/27/1986	M	5.00	22.00		7.60	.00	
2-JMS099.30	5/27/1986	M	7.00	22.00		7.60	.00	
2-JMS099.30	5/27/1986	M	9.00	22.00		7.60	.00	
2-JMS099.30	5/27/1986	B	11.00	22.00	7.91	7.60	.00	7.20
2-JMS099.30	6/9/1986	S	1.00	27.00	7.84	6.00	.00	6.00
2-JMS099.30	6/9/1986	M	3.00	27.00		5.80	.00	
2-JMS099.30	6/9/1986	M	5.00	27.00		5.70	.00	
2-JMS099.30	6/9/1986	M	7.00	27.00		5.70	.00	
2-JMS099.30	6/9/1986	B	9.00	27.00	7.90	5.70	.00	5.00
2-JMS099.30	6/24/1986	S	1.00	27.00	7.88	6.30	.00	5.50
2-JMS099.30	6/24/1986	M	3.00	27.00		6.00	.00	
2-JMS099.30	6/24/1986	M	5.00	27.00		5.70	.00	
2-JMS099.30	6/24/1986	M	7.00	27.00		5.50	.00	
2-JMS099.30	6/24/1986	M	9.00	27.00		5.70	.00	
2-JMS099.30	6/24/1986	B	10.00	27.00	7.81	5.70	.00	5.20
2-JMS099.30	7/8/1986	S	1.00	27.00	7.68	7.56	.00	8.50
2-JMS099.30	7/8/1986	M	3.00	26.70		7.00	.00	
2-JMS099.30	7/8/1986	M	5.00	26.70		6.97	.00	
2-JMS099.30	7/8/1986	M	7.00	26.60		6.84	.00	
2-JMS099.30	7/8/1986	B	9.00	26.60	8.23	6.76	.00	4.60
2-JMS099.30	7/22/1986	S	1.00	30.50	8.02	6.40	.00	6.30
2-JMS099.30	7/22/1986	M	3.00	30.50		6.10	.00	
2-JMS099.30	7/22/1986	M	5.00	30.50		5.80	.00	
2-JMS099.30	7/22/1986	M	7.00	30.50		5.80	.00	
2-JMS099.30	7/22/1986	M	9.00	30.50		5.80	.00	
2-JMS099.30	7/22/1986	B	11.00	30.50	7.86	5.70	.00	5.50
2-JMS099.30	8/6/1986	S	1.00	30.00	7.83		.00	6.90
2-JMS099.30	8/6/1986	M	3.00	30.00			.00	
2-JMS099.30	8/6/1986	M	5.00	30.00			.00	
2-JMS099.30	8/6/1986	M	7.00	29.50			.00	
2-JMS099.30	8/6/1986	M	9.00	29.50			.00	
2-JMS099.30	8/6/1986	B	10.00	29.50	7.76		.00	5.00
2-JMS099.30	8/20/1986	S	1.00	27.00	7.35	5.10	.00	5.00
2-JMS099.30	8/20/1986	M	3.00	27.00		5.10	.00	
2-JMS099.30	8/20/1986	M	5.00	27.00		5.00	.00	
2-JMS099.30	8/20/1986	M	7.00	27.00		5.00	.00	
2-JMS099.30	8/20/1986	M	9.00	27.00		5.00	.00	
2-JMS099.30	8/20/1986	B	11.00	27.00		5.00	.00	
2-JMS099.30	8/20/1986	B	12.00	27.00	7.40	5.00	.00	5.30

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	9/9/1986	S	1.00	24.00	8.10	8.00	.00	7.80
2-JMS099.30	9/9/1986	M	3.00	23.50		7.70	.00	
2-JMS099.30	9/9/1986	M	5.00	23.50		7.70	.00	
2-JMS099.30	9/9/1986	M	7.00	23.50		7.70	.00	
2-JMS099.30	9/9/1986	M	9.00	23.50		7.80	.00	
2-JMS099.30	9/9/1986	B	10.00	23.50	7.96	7.80	.00	7.20
2-JMS099.30	9/23/1986	S	1.00	21.70	8.07		.00	8.70
2-JMS099.30	9/23/1986	M	3.00	21.60			.00	
2-JMS099.30	9/23/1986	M	5.00	21.40			.00	
2-JMS099.30	9/23/1986	M	7.00	21.30			.00	
2-JMS099.30	9/23/1986	M	9.00	21.30			.00	
2-JMS099.30	9/23/1986	B	10.00	21.30	8.19		.00	7.30
2-JMS099.30	10/7/1986	S	1.00	25.60	7.82	4.90	.00	6.50
2-JMS099.30	10/7/1986	M	3.00	25.40		4.60	.00	
2-JMS099.30	10/7/1986	M	5.00	25.40		4.60	.00	
2-JMS099.30	10/7/1986	M	7.00	25.40		4.60	.00	
2-JMS099.30	10/7/1986	M	9.00	25.40		4.60	.00	
2-JMS099.30	10/7/1986	B	11.00	25.40	7.83	4.60	.00	6.20
2-JMS099.30	10/28/1986	S	1.00	17.10	7.89	8.00	.00	7.80
2-JMS099.30	10/28/1986	M	3.00	17.10		7.90	.00	
2-JMS099.30	10/28/1986	M	5.00	16.80		7.80	.00	
2-JMS099.30	10/28/1986	M	7.00	16.80		7.80	.00	
2-JMS099.30	10/28/1986	M	9.00	16.80		7.80	.00	
2-JMS099.30	10/28/1986	B	11.00	16.80	7.98	7.70		7.50
2-JMS099.30	11/25/1986	S	1.00	8.50	8.07	11.20	.00	
2-JMS099.30	11/25/1986	M	3.00	8.50		11.20	.00	
2-JMS099.30	11/25/1986	M	5.00	8.50		11.20	.00	
2-JMS099.30	11/25/1986	M	7.00	8.00		11.20	.00	
2-JMS099.30	11/25/1986	M	9.00	8.00		11.10	.00	
2-JMS099.30	11/25/1986	B	11.00	8.00	7.93	11.20	.00	
2-JMS099.30	12/22/1986	S	1.00	7.50	8.18	12.10	.00	12.10
2-JMS099.30	12/22/1986	M	3.00	4.50		12.10	.00	
2-JMS099.30	12/22/1986	M	5.00	4.50		12.10	.00	
2-JMS099.30	12/22/1986	M	7.00	4.50		12.10	.00	
2-JMS099.30	12/22/1986	M	9.00	4.50		12.10	.00	
2-JMS099.30	12/22/1986	B	11.00	4.50	8.10	12.10	.00	12.50
2-JMS099.30	1/5/1987	S	1.00	4.00	7.15	12.70	.00	13.00
2-JMS099.30	1/5/1987	M	3.00	4.00		12.60	.00	
2-JMS099.30	1/5/1987	M	5.00	4.00		12.60	.00	
2-JMS099.30	1/5/1987	M	7.00	4.00		12.60	.00	
2-JMS099.30	1/5/1987	M	9.00	4.00		12.60	.00	
2-JMS099.30	1/5/1987	B	11.00	4.00	7.12	12.60	.00	12.80
2-JMS099.30	3/4/1987	S	1.00	7.20	7.81	12.40	.00	12.20
2-JMS099.30	3/4/1987	M	3.00	7.20		12.30	.00	
2-JMS099.30	3/4/1987	M	5.00	7.20		12.40	.00	
2-JMS099.30	3/4/1987	M	7.00	7.20		12.40	.00	
2-JMS099.30	3/4/1987	M	9.00	7.20		12.40	.00	
2-JMS099.30	3/4/1987	M	11.00	7.20		12.40	.00	
2-JMS099.30	3/4/1987	B	13.00	7.20	7.70	12.40	.00	11.50
2-JMS099.30	3/18/1987	S	1.00	9.10	7.87	12.10	.00	11.10
2-JMS099.30	3/18/1987	M	3.00	8.90		12.10	.00	
2-JMS099.30	3/18/1987	M	5.00	8.90		12.10	.00	
2-JMS099.30	3/18/1987	M	7.00	8.90		12.10	.00	
2-JMS099.30	3/18/1987	M	9.00	8.80		12.20	.00	
2-JMS099.30	3/18/1987	B	11.00	8.90	7.78	12.20	.00	11.90
2-JMS099.30	4/8/1987	S	1.00	9.50	7.57	12.50	.00	11.70
2-JMS099.30	4/8/1987	M	3.00	9.40		12.50	.00	
2-JMS099.30	4/8/1987	M	5.00	9.40		12.40	.00	
2-JMS099.30	4/8/1987	M	7.00	9.40		12.40	.00	
2-JMS099.30	4/8/1987	M	9.00	9.40		12.40	.00	
2-JMS099.30	4/8/1987	B	11.00	9.40	7.71	12.40	.00	11.10
2-JMS099.30	4/14/1987	S	1.00	12.00	6.84	7.60	.00	8.90

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	4/14/1987	M	3.00	12.00		7.60	.00	
2-JMS099.30	4/14/1987	M	5.00	12.00		7.60	.00	
2-JMS099.30	4/14/1987	M	7.00	12.00		7.50	.00	
2-JMS099.30	4/14/1987	M	9.00	12.00		7.50	.00	
2-JMS099.30	4/14/1987	B	11.00	12.00	7.02	7.50	.00	8.20
2-JMS099.30	5/6/1987	S	1.00	16.50	7.78	9.80	.00	9.10
2-JMS099.30	5/6/1987	M	3.00	16.50		9.80	.00	
2-JMS099.30	5/6/1987	M	5.00	16.50		9.70	.00	
2-JMS099.30	5/6/1987	M	7.00	16.50		9.60	.00	
2-JMS099.30	5/6/1987	M	9.00	16.50		9.60	.00	
2-JMS099.30	5/6/1987	M	11.00	16.50		9.60	.00	
2-JMS099.30	5/6/1987	B	12.00	16.50	7.61	9.60	.00	9.50
2-JMS099.30	5/18/1987	S	1.00	23.38	9.22	10.00	.00	8.70
2-JMS099.30	5/18/1987	M	3.00	22.90		9.40	.00	
2-JMS099.30	5/18/1987	M	5.00	22.60		9.10	.00	
2-JMS099.30	5/18/1987	M	7.00	22.40		9.10	.00	
2-JMS099.30	5/18/1987	M	9.00	22.30		9.00	.00	
2-JMS099.30	5/18/1987	B	10.00	22.00	8.81	9.00	.00	9.20
2-JMS099.30	6/1/1987	S	1.00	28.40		7.63	.00	7.40
2-JMS099.30	6/1/1987	M	3.00	28.00		7.08	.00	
2-JMS099.30	6/1/1987	M	5.00	28.00		7.10	.00	
2-JMS099.30	6/1/1987	M	7.00	28.00		7.13	.00	
2-JMS099.30	6/1/1987	M	9.00	28.00		7.16	.00	
2-JMS099.30	6/1/1987	B	11.00	28.00	7.35	7.14	.00	6.90
2-JMS099.30	6/15/1987	S	1.00	27.10	7.96	6.60	.00	5.70
2-JMS099.30	6/15/1987	M	3.00	26.80		6.30	.00	
2-JMS099.30	6/15/1987	M	5.00	26.70		6.10	.00	
2-JMS099.30	6/15/1987	M	7.00	26.60		5.90	.00	
2-JMS099.30	6/15/1987	M	9.00	26.60		5.80	.00	
2-JMS099.30	6/15/1987	B	11.00	26.60	7.96	6.10	.00	5.50
2-JMS099.30	6/29/1987	S	1.00	28.00	7.38	5.70	.00	6.10
2-JMS099.30	6/29/1987	M	3.00	27.50		5.30	.00	
2-JMS099.30	6/29/1987	M	5.00	27.50		5.30	.00	
2-JMS099.30	6/29/1987	M	7.00	27.50		5.30	.00	
2-JMS099.30	6/29/1987	M	9.00	27.50		5.30	.00	
2-JMS099.30	6/29/1987	B	11.00	27.50	7.40	5.30	.00	4.90
2-JMS099.30	7/13/1987	S	1.00	32.00	8.24	5.80	.00	5.70
2-JMS099.30	7/13/1987	M	3.00	31.50		5.40	.00	
2-JMS099.30	7/13/1987	M	5.00	31.00		5.30	.00	
2-JMS099.30	7/13/1987	M	7.00	31.00		5.30	.00	
2-JMS099.30	7/13/1987	M	9.00	31.00		5.30	.00	
2-JMS099.30	7/13/1987	B	11.00	31.00	8.20	5.20	.00	5.20
2-JMS099.30	8/11/1987	S	1.00	30.80		7.47	.00	6.20
2-JMS099.30	8/11/1987	M	3.00	29.90		5.87	.00	
2-JMS099.30	8/11/1987	M	5.00	29.80		5.76	.00	
2-JMS099.30	8/11/1987	M	7.00	29.80		5.75	.00	
2-JMS099.30	8/11/1987	B	9.00	29.80	8.28	5.66	.00	5.30
2-JMS099.30	8/25/1987	S	1.00	27.70	7.78	4.00	.00	3.90
2-JMS099.30	8/25/1987	M	3.00	27.70		3.80	.00	
2-JMS099.30	8/25/1987	M	5.00	27.70		3.90	.00	
2-JMS099.30	8/25/1987	M	7.00	27.70		3.90	.00	
2-JMS099.30	8/25/1987	M	9.00	27.60		3.90	.00	
2-JMS099.30	8/25/1987	B	11.00	27.60	8.28	3.80	.00	4.00
2-JMS099.30	10/8/1987	S	1.00	17.30	7.38	8.40	.00	8.90
2-JMS099.30	10/8/1987	M	3.00	17.30		8.40	.00	
2-JMS099.30	10/8/1987	M	5.00	17.20		8.40	.00	
2-JMS099.30	10/8/1987	M	7.00	17.20		8.40	.00	
2-JMS099.30	10/8/1987	B	9.00	17.20	7.38	8.40	.00	8.60
2-JMS099.30	10/27/1987	S	1.00	14.40		9.80	.00	
2-JMS099.30	10/27/1987	M	3.00	14.40		9.50	.00	
2-JMS099.30	10/27/1987	M	5.00	14.40		9.40	.00	
2-JMS099.30	10/27/1987	M	7.00	14.40		9.40	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	10/27/1987	M	9.00	14.40		9.50	.00	
2-JMS099.30	10/27/1987	B	10.00	14.40		9.50	.00	
2-JMS099.30	11/9/1987	S	1.00	14.00	7.70	8.80	.00	8.70
2-JMS099.30	11/9/1987	M	3.00	14.00		8.70	.00	
2-JMS099.30	11/9/1987	M	5.00	14.00		8.80	.00	
2-JMS099.30	11/9/1987	M	7.00	14.00		8.70	.00	
2-JMS099.30	11/9/1987	M	9.00	14.00		8.70	.00	
2-JMS099.30	11/9/1987	B	10.00	14.00	7.87	8.70	.00	8.80
2-JMS099.30	3/7/1988	S	1.00					
2-JMS099.30	5/16/1988	S	11.00					
2-JMS099.30	6/29/1988	S	1.00	25.50	7.83	5.01	.00	
2-JMS099.30	6/29/1988	M	3.00	25.50		5.02	.00	
2-JMS099.30	6/29/1988	M	5.00	25.50		4.78	.00	
2-JMS099.30	6/29/1988	M	7.00	25.30		5.00	.00	
2-JMS099.30	6/29/1988	B	8.00	25.40	7.83	5.03	.00	
2-JMS099.30	7/18/1988	S	1.00	30.00	7.47	6.90	.00	
2-JMS099.30	7/18/1988	M	3.00	30.00		4.80	.00	
2-JMS099.30	7/18/1988	M	5.00	30.00		4.50	.00	
2-JMS099.30	7/18/1988	M	7.00	30.00		4.30	.00	
2-JMS099.30	7/18/1988	M	9.00	30.00		4.40	.00	
2-JMS099.30	7/18/1988	B	11.00	30.00	7.54	4.30	.00	
2-JMS099.30	8/1/1988	S	1.00	28.40	7.38	6.47	.00	
2-JMS099.30	8/1/1988	M	3.00	28.30		6.45	.00	
2-JMS099.30	8/1/1988	M	5.00	28.20		6.20	.00	
2-JMS099.30	8/1/1988	M	7.00	28.10		6.10	.00	
2-JMS099.30	8/1/1988	B	9.00	28.00	7.33	5.97	.00	
2-JMS099.30	8/15/1988	S	1.00	29.20	7.84	7.28	.00	
2-JMS099.30	8/15/1988	M	3.00	28.50		5.20	.00	
2-JMS099.30	8/15/1988	M	5.00	28.50		4.84	.00	
2-JMS099.30	8/15/1988	M	7.00	28.40		4.78	.00	
2-JMS099.30	8/15/1988	M	9.00	28.40		3.54	.00	
2-JMS099.30	8/15/1988	B	10.00	28.40	7.66	3.37	.00	
2-JMS099.30	9/12/1988	S	1.00	23.80	7.66	7.60	.00	
2-JMS099.30	9/12/1988	M	3.00	23.60		7.30	.00	
2-JMS099.30	9/12/1988	M	5.00	23.60		7.30	.00	
2-JMS099.30	9/12/1988	M	7.00	23.60		7.30	.00	
2-JMS099.30	9/12/1988	M	9.00	23.50		7.20	.00	
2-JMS099.30	9/12/1988	B	11.00	23.50	7.50	7.20	.00	
2-JMS099.30	9/27/1988	S	1.00	23.70	7.38	6.10	.00	
2-JMS099.30	9/27/1988	M	3.00	23.60		5.90	.00	
2-JMS099.30	9/27/1988	M	5.00	23.60		5.90	.00	
2-JMS099.30	9/27/1988	M	7.00	23.60		5.90	.00	
2-JMS099.30	9/27/1988	M	9.00	23.60		5.80	.00	
2-JMS099.30	9/27/1988	B	11.00	23.60	7.31	5.80	.00	
2-JMS099.30	10/11/1988	S	1.00	17.40	7.57	7.91	.00	
2-JMS099.30	10/11/1988	M	3.00	17.30		7.90	.00	
2-JMS099.30	10/11/1988	M	5.00	17.30		7.92	.00	
2-JMS099.30	10/11/1988	M	7.00	17.30		7.89	.00	
2-JMS099.30	10/11/1988	B	9.00	17.30		7.89		
2-JMS099.30	10/26/1988	S	1.00	14.00	7.58	8.33	.00	
2-JMS099.30	10/26/1988	M	3.00	14.00		8.28	.00	
2-JMS099.30	10/26/1988	M	5.00	13.90		8.31	.00	
2-JMS099.30	10/26/1988	M	7.00	13.90		8.31	.00	
2-JMS099.30	10/26/1988	M	9.00	13.90		8.76	.00	
2-JMS099.30	10/26/1988	B	11.00	13.90	7.44	8.40	.00	
2-JMS099.30	11/14/1988	S	1.00	12.00	7.52	9.92	.00	
2-JMS099.30	11/14/1988	M	3.00	11.90		9.94	.00	
2-JMS099.30	11/14/1988	M	5.00	11.80		9.91	.00	
2-JMS099.30	11/14/1988	M	7.00	11.80		9.90	.00	
2-JMS099.30	11/14/1988	M	9.00	11.80		9.90	.00	
2-JMS099.30	11/14/1988	B	11.00	11.80	7.49	9.91	.00	
2-JMS099.30	12/20/1988	S	1.00	3.13	8.02	13.52	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	12/20/1988	M	3.00	3.05		13.72	.00	
2-JMS099.30	12/20/1988	M	5.00	3.05		13.66	.00	
2-JMS099.30	12/20/1988	M	7.00	2.98		13.69	.00	
2-JMS099.30	12/20/1988	M	9.00	2.97		13.65	.00	
2-JMS099.30	12/20/1988	B	11.00	2.94	7.64	13.68	.00	
2-JMS099.30	1/11/1989	S	1.00	6.12	7.45	12.00	.00	
2-JMS099.30	1/11/1989	M	3.00	6.10		12.00	.00	
2-JMS099.30	1/11/1989	M	5.00	6.09		11.95	.00	
2-JMS099.30	1/11/1989	M	7.00	6.07		11.96	.00	
2-JMS099.30	1/11/1989	M	9.00	6.03		11.99	.00	
2-JMS099.30	1/11/1989	B	11.00	6.02	7.45	12.01	.00	
2-JMS099.30	2/8/1989	S	1.00	6.87	7.59	11.84	.00	
2-JMS099.30	2/8/1989	M	3.00	6.85		11.86	.00	
2-JMS099.30	2/8/1989	M	5.00	6.84		11.86	.00	
2-JMS099.30	2/8/1989	M	7.00	6.84		11.81	.00	
2-JMS099.30	2/8/1989	M	9.00	6.84		11.81	.00	
2-JMS099.30	2/8/1989	B	11.00	6.85	7.59	11.80	.00	
2-JMS099.30	3/15/1989	S	1.00	8.26	7.22	11.63	.00	
2-JMS099.30	3/15/1989	M	3.00	8.14		11.63	.00	
2-JMS099.30	3/15/1989	M	5.00	8.09		11.64	.00	
2-JMS099.30	3/15/1989	M	7.00	8.05		11.67	.00	
2-JMS099.30	3/15/1989	M	9.00	8.04		11.63	.00	
2-JMS099.30	3/15/1989	M	11.00	8.08		11.54	.00	
2-JMS099.30	3/15/1989	B	12.00	8.04	7.28	11.68	.00	
2-JMS099.30	3/28/1989	S	1.00	13.03	7.37	10.40	.00	
2-JMS099.30	3/28/1989	M	3.00	12.94		10.40	.00	
2-JMS099.30	3/28/1989	M	5.00	12.95		10.41	.00	
2-JMS099.30	3/28/1989	M	7.00	12.88		10.41	.00	
2-JMS099.30	3/28/1989	B	9.00	12.81	7.37	10.40	.00	
2-JMS099.30	4/13/1989	S	1.00	12.12	7.13	10.52	.00	
2-JMS099.30	4/13/1989	M	3.00	11.99		10.52	.00	
2-JMS099.30	4/13/1989	M	5.00	11.97		10.49	.00	
2-JMS099.30	4/13/1989	M	7.00	11.89		10.49	.00	
2-JMS099.30	4/13/1989	M	9.00	11.78		10.49	.00	
2-JMS099.30	4/13/1989	B	10.00	11.68	7.21	10.49	.00	
2-JMS099.30	2/13/1990	S	1.00	9.25	7.40	11.23	.00	
2-JMS099.30	2/13/1990	M	3.00	9.24		11.18	.00	
2-JMS099.30	2/13/1990	M	5.00	9.22		11.19	.00	
2-JMS099.30	2/13/1990	M	7.00	9.24		11.19	.00	
2-JMS099.30	2/13/1990	M	9.00	9.27		11.17	.00	
2-JMS099.30	2/13/1990	B	10.00	9.31	7.43	11.02	.00	
2-JMS099.30	3/13/1990	S	1.00	15.18	7.95	10.21	.00	
2-JMS099.30	3/13/1990	M	3.00	14.83		10.16	.00	
2-JMS099.30	3/13/1990	M	5.00	14.86		10.15	.00	
2-JMS099.30	3/13/1990	M	7.00	14.88		10.17	.00	
2-JMS099.30	3/13/1990	M	9.00	14.94		10.15	.00	
2-JMS099.30	3/13/1990	B	11.00	14.90	7.72	10.10	.00	
2-JMS099.30	3/28/1990	S	1.00	11.73	7.44	10.60	.00	
2-JMS099.30	3/28/1990	M	3.00	11.66		10.60	.00	
2-JMS099.30	3/28/1990	M	5.00	11.74		10.65	.00	
2-JMS099.30	3/28/1990	M	7.00	11.63		10.61	.00	
2-JMS099.30	3/28/1990	M	9.00	11.63		10.63	.00	
2-JMS099.30	3/28/1990	B	11.00	11.58	7.43	10.65	.00	
2-JMS099.30	4/10/1990	S	1.00	12.11	7.15	10.58	.00	
2-JMS099.30	4/10/1990	M	3.00	12.09		10.57	.00	
2-JMS099.30	4/10/1990	M	5.00	12.09		10.53	.00	
2-JMS099.30	4/10/1990	M	7.00	12.06		10.55	.00	
2-JMS099.30	4/10/1990	M	9.00	12.09		10.54	.00	
2-JMS099.30	4/10/1990	B	10.00	12.08	7.16	10.45	.00	
2-JMS099.30	4/25/1990	S	1.00	20.07	7.50	8.62	.00	
2-JMS099.30	4/25/1990	M	3.00	20.01		8.66	.00	
2-JMS099.30	4/25/1990	M	5.00	19.99		8.71	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	4/25/1990	M	7.00	19.99		8.71	.00	
2-JMS099.30	4/25/1990	M	9.00	20.00		8.70	.00	
2-JMS099.30	4/25/1990	B	11.00	20.00	7.49	8.71	.00	
2-JMS099.30	5/9/1990	S	1.00	21.95	7.60	8.12	.00	
2-JMS099.30	5/9/1990	M	3.00	21.85		8.11	.00	
2-JMS099.30	5/9/1990	M	5.00	21.83		8.12	.00	
2-JMS099.30	5/9/1990	M	7.00	21.78		8.13	.00	
2-JMS099.30	5/9/1990	M	9.00	21.74		8.16	.00	
2-JMS099.30	5/9/1990	B	11.00	21.63	7.50	8.19	.00	
2-JMS099.30	5/31/1990	S	1.00	17.94	7.17	9.13	.00	
2-JMS099.30	5/31/1990	M	3.00	17.94		9.13	.00	
2-JMS099.30	5/31/1990	M	5.00	17.95		9.16	.00	
2-JMS099.30	5/31/1990	M	7.00	17.96		9.15	.00	
2-JMS099.30	5/31/1990	M	9.00	17.92		9.16	.00	
2-JMS099.30	5/31/1990	M	11.00	17.94		9.13	.00	
2-JMS099.30	5/31/1990	B	12.00	17.94	7.30	9.15	.00	
2-JMS099.30	6/14/1990	S	1.00	24.69	7.37	8.21	.00	
2-JMS099.30	6/14/1990	M	3.00	24.33		7.97	.00	
2-JMS099.30	6/14/1990	M	5.00	24.24		7.88	.00	
2-JMS099.30	6/14/1990	M	7.00	24.22		7.91	.00	
2-JMS099.30	6/14/1990	M	9.00	24.24		7.90	.00	
2-JMS099.30	6/14/1990	B	11.00	24.25	7.39	7.87	.00	
2-JMS099.30	6/27/1990	S	1.00	28.00	7.25	6.90	.00	
2-JMS099.30	6/27/1990	M	3.00	27.74		6.70	.00	
2-JMS099.30	6/27/1990	M	5.00	27.73		6.67	.00	
2-JMS099.30	6/27/1990	M	7.00	27.68		6.66	.00	
2-JMS099.30	6/27/1990	M	9.00	27.66		6.64	.00	
2-JMS099.30	6/27/1990	B	11.00	27.66	7.30	6.61	.00	
2-JMS099.30	7/10/1990	S	1.00	29.95	7.27	7.39	.00	
2-JMS099.30	7/10/1990	M	3.00	29.65		6.75	.00	
2-JMS099.30	7/10/1990	M	5.00	29.22		6.39	.00	
2-JMS099.30	7/10/1990	M	7.00	29.20		6.38	.00	
2-JMS099.30	7/10/1990	M	9.00	29.12		6.41	.00	
2-JMS099.30	7/10/1990	B	11.00	29.12	7.38	6.36	.00	
2-JMS099.30	7/24/1990	S	1.00	30.21	7.32	7.50	.00	
2-JMS099.30	7/24/1990	M	3.00	30.06		7.25	.00	
2-JMS099.30	7/24/1990	M	5.00	30.07		7.33	.00	
2-JMS099.30	7/24/1990	M	7.00	30.05		7.27	.00	
2-JMS099.30	7/24/1990	M	9.00	30.03		7.02	.00	
2-JMS099.30	7/24/1990	B	10.00	29.91	7.22	6.96	.00	
2-JMS099.30	8/7/1990	S	1.00	27.80	6.81	6.42	.00	
2-JMS099.30	8/7/1990	M	3.00	27.69		6.09	.00	
2-JMS099.30	8/7/1990	M	5.00	27.54		6.00	.00	
2-JMS099.30	8/7/1990	M	7.00	27.46		6.08	.00	
2-JMS099.30	8/7/1990	M	9.00	27.40		6.14	.00	
2-JMS099.30	8/7/1990	B	11.00	27.42	6.95	6.46	.00	
2-JMS099.30	8/23/1990	S	1.00	27.47	6.97	5.79	.00	
2-JMS099.30	8/23/1990	M	3.00	27.23		5.80	.00	
2-JMS099.30	8/23/1990	M	5.00	27.01		5.72	.00	
2-JMS099.30	8/23/1990	M	7.00	26.79		5.80	.00	
2-JMS099.30	8/23/1990	M	9.00	26.75		5.92	.00	
2-JMS099.30	8/23/1990	M	11.00	26.71		6.07	.00	
2-JMS099.30	8/23/1990	B	12.00	26.73	7.03	6.26	.00	
2-JMS099.30	9/6/1990	S	1.00	27.96	7.12	7.08	.00	
2-JMS099.30	9/6/1990	M	3.00	27.86		6.79	.00	
2-JMS099.30	9/6/1990	M	5.00	27.79		6.73	.00	
2-JMS099.30	9/6/1990	M	7.00	27.82		6.78	.00	
2-JMS099.30	9/6/1990	M	9.00	27.80		6.73	.00	
2-JMS099.30	9/6/1990	B	11.00	27.78	7.16	6.72	.00	
2-JMS099.30	9/24/1990	S	1.00	22.25	7.40	8.86	.00	
2-JMS099.30	9/24/1990	M	3.00	21.90		7.92	.00	
2-JMS099.30	9/24/1990	M	5.00	21.77		7.73	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	9/24/1990	M	7.00	21.76		7.71	.00	
2-JMS099.30	9/24/1990	M	9.00	21.76		7.66	.00	
2-JMS099.30	9/24/1990	B	11.00	21.74		7.65	.00	
2-JMS099.30	10/9/1990	S	1.00	23.06	7.08	7.79	.00	
2-JMS099.30	10/9/1990	M	3.00	22.80		7.35	.00	
2-JMS099.30	10/9/1990	M	5.00	22.45		7.14	.00	
2-JMS099.30	10/9/1990	M	7.00	22.45		7.09	.00	
2-JMS099.30	10/9/1990	M	9.00	22.46		7.11	.00	
2-JMS099.30	10/9/1990	B	11.00	22.48	7.24	7.08	.00	
2-JMS099.30	10/25/1990	S	1.00	15.94	7.27	9.20	.00	
2-JMS099.30	10/25/1990	M	3.00	15.94		9.21	.00	
2-JMS099.30	10/25/1990	M	5.00	15.94		9.23	.00	
2-JMS099.30	10/25/1990	M	7.00	15.94		9.19	.00	
2-JMS099.30	10/25/1990	M	9.00	15.95		9.15	.00	
2-JMS099.30	10/25/1990	B	11.00	15.95	7.29	9.11	.00	
2-JMS099.30	11/7/1990	S	1.00	14.88	7.10	9.42	.00	
2-JMS099.30	11/7/1990	M	3.00	14.86		9.43	.00	
2-JMS099.30	11/7/1990	M	5.00	14.77		9.41	.00	
2-JMS099.30	11/7/1990	M	7.00	14.77		9.42	.00	
2-JMS099.30	11/7/1990	M	9.00	14.80		9.40	.00	
2-JMS099.30	11/7/1990	B	11.00	14.80	7.10	9.45	.00	
2-JMS099.30	12/12/1990	S	1.00	6.57	7.04	12.85	.00	
2-JMS099.30	12/12/1990	M	3.00	6.57		12.86	.00	
2-JMS099.30	12/12/1990	M	5.00	6.56		12.85	.00	
2-JMS099.30	12/12/1990	M	7.00	6.56		13.10	.00	
2-JMS099.30	12/12/1990	M	9.00	6.53		13.06	.00	
2-JMS099.30	12/12/1990	B	10.00	6.56	7.00	13.10	.00	
2-JMS099.30	1/14/1991	S	1.00	6.35	7.14	11.81	.00	
2-JMS099.30	1/14/1991	M	3.00	6.35		12.17	.00	
2-JMS099.30	1/14/1991	B	10.00	6.36	7.20	12.12	.00	
2-JMS099.30	2/25/1991	S	1.00	7.36	7.25	12.21	.00	
2-JMS099.30	2/25/1991	M	3.00	7.32		12.29	.00	
2-JMS099.30	2/25/1991	M	5.00	7.33		12.30	.00	
2-JMS099.30	2/25/1991	M	7.00	7.34		12.36	.00	
2-JMS099.30	2/25/1991	M	9.00	7.33		12.47	.00	
2-JMS099.30	2/25/1991	B	11.00	7.36	7.24	12.57	.00	
2-JMS099.30	3/6/1991	S	1.00	10.05	7.11	11.09	.00	
2-JMS099.30	3/6/1991	M	3.00	10.06		11.09	.00	
2-JMS099.30	3/6/1991	M	5.00	10.06		11.08	.00	
2-JMS099.30	3/6/1991	M	7.00	10.07		11.17	.00	
2-JMS099.30	3/6/1991	M	9.00	10.08		11.25	.00	
2-JMS099.30	3/6/1991	B	11.00	10.08	7.10	11.43	.00	
2-JMS099.30	3/20/1991	S	1.00	10.19	6.94	10.88	.00	
2-JMS099.30	3/20/1991	M	3.00	10.19		10.89	.00	
2-JMS099.30	3/20/1991	M	5.00	10.15		10.91	.00	
2-JMS099.30	3/20/1991	M	7.00	10.16		10.89	.00	
2-JMS099.30	3/20/1991	M	9.00	10.17		10.89	.00	
2-JMS099.30	3/20/1991	B	10.00	10.18	6.95	10.88	.00	
2-JMS099.30	4/3/1991	S	1.00	11.47	6.86	11.17	.00	
2-JMS099.30	4/3/1991	M	3.00	11.46		11.18	.00	
2-JMS099.30	4/3/1991	M	5.00	11.46		11.24	.00	
2-JMS099.30	4/3/1991	M	7.00	11.48		11.27	.00	
2-JMS099.30	4/3/1991	M	9.00	11.48		11.33	.00	
2-JMS099.30	4/3/1991	B	10.00	11.48	6.84	11.38	.00	
2-JMS099.30	4/23/1991	S	1.00	14.06	6.99	10.13	.00	
2-JMS099.30	4/23/1991	M	3.00	14.00		10.19	.00	
2-JMS099.30	4/23/1991	M	5.00	13.90		10.20	.00	
2-JMS099.30	4/23/1991	M	7.00	13.90		10.25	.00	
2-JMS099.30	4/23/1991	M	9.00	13.91		10.36	.00	
2-JMS099.30	4/23/1991	B	10.00	13.91	6.98	10.38	.00	
2-JMS099.30	5/2/1991	S	1.00	21.79	7.29	8.38	.00	
2-JMS099.30	5/2/1991	M	3.00	21.79		8.36	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	5/2/1991	M	5.00	21.78		8.39	.00	
2-JMS099.30	5/2/1991	M	7.00	21.78		8.42	.00	
2-JMS099.30	5/2/1991	M	9.00	21.79		8.44	.00	
2-JMS099.30	5/2/1991	B	11.00	21.82	7.14	8.51	.00	
2-JMS099.30	5/16/1991	S	1.00	25.70	7.21	6.97	.00	
2-JMS099.30	5/16/1991	M	3.00	25.52		7.00	.00	
2-JMS099.30	5/16/1991	M	5.00	25.41		7.06	.00	
2-JMS099.30	5/16/1991	M	7.00	25.41		7.01	.00	
2-JMS099.30	5/16/1991	M	9.00	25.33		7.01	.00	
2-JMS099.30	5/16/1991	B	11.00	25.30	7.27	7.02	.00	
2-JMS099.30	6/13/1991	S	1.00	26.83	7.29	7.31	.00	
2-JMS099.30	6/13/1991	M	3.00	26.81		7.17	.00	
2-JMS099.30	6/13/1991	M	5.00	26.80		7.14	.00	
2-JMS099.30	6/13/1991	M	7.00	26.80		7.13	.00	
2-JMS099.30	6/13/1991	B	8.00	26.78	7.27	7.10	.00	
2-JMS099.30	6/27/1991	S	1.00	25.94	7.06	7.13	.00	
2-JMS099.30	6/27/1991	M	3.00	25.22		7.02	.00	
2-JMS099.30	6/27/1991	M	5.00	25.13		7.04	.00	
2-JMS099.30	6/27/1991	M	7.00	25.06		7.07	.00	
2-JMS099.30	6/27/1991	B	9.00	24.94	7.13	7.07	.00	
2-JMS099.30	7/16/1991	S	1.00	28.78	7.14	6.30	.00	
2-JMS099.30	7/16/1991	M	3.00	28.57		6.35	.00	
2-JMS099.30	7/16/1991	M	5.00	28.52		6.31	.00	
2-JMS099.30	7/16/1991	M	7.00	28.66		6.34	.00	
2-JMS099.30	7/16/1991	M	9.00	28.32		6.21	.00	
2-JMS099.30	7/16/1991	B	10.00	28.33	7.25	6.24	.00	
2-JMS099.30	7/30/1991	S	1.00	24.61	6.73	7.11	.00	
2-JMS099.30	7/30/1991	M	3.00	24.57		7.11	.00	
2-JMS099.30	7/30/1991	M	5.00	24.56		7.13	.00	
2-JMS099.30	7/30/1991	M	7.00	24.56		7.17	.00	
2-JMS099.30	7/30/1991	M	9.00	24.56		7.23	.00	
2-JMS099.30	7/30/1991	B	10.00	24.56	6.79	7.38	.00	
2-JMS099.30	8/13/1991	S	1.00	26.32	6.74	7.59	.00	
2-JMS099.30	8/13/1991	M	3.00	26.05		7.61	.00	
2-JMS099.30	8/13/1991	M	5.00	26.02		7.66	.00	
2-JMS099.30	8/13/1991	M	7.00	26.04		7.68	.00	
2-JMS099.30	8/13/1991	M	9.00	26.05		7.72	.00	
2-JMS099.30	8/13/1991	B	10.00	26.07	6.82	7.78	.00	
2-JMS099.30	8/27/1991	S	1.00	28.16	7.07	6.38	.00	
2-JMS099.30	8/27/1991	M	3.00	27.89		6.21	.00	
2-JMS099.30	8/27/1991	M	5.00	27.69		6.19	.00	
2-JMS099.30	8/27/1991	M	7.00	27.73		6.22	.00	
2-JMS099.30	8/27/1991	M	9.00	27.68		6.23	.00	
2-JMS099.30	8/27/1991	B	11.00	27.57	6.94	6.46	.00	
2-JMS099.30	9/12/1991	S	1.00	27.40	7.40	8.64	.00	
2-JMS099.30	9/12/1991	M	3.00	27.20		8.21	.00	
2-JMS099.30	9/12/1991	M	5.00	27.22		8.26	.00	
2-JMS099.30	9/12/1991	M	7.00	27.12		8.10	.00	
2-JMS099.30	9/12/1991	M	9.00	27.13		8.23	.00	
2-JMS099.30	9/12/1991	B	10.00	27.14		8.12	.00	
2-JMS099.30	10/1/1991	S	1.00	22.11	7.13	7.73	.00	
2-JMS099.30	10/1/1991	M	3.00	21.86		7.38	.00	
2-JMS099.30	10/1/1991	M	5.00	21.72		7.35	.00	
2-JMS099.30	10/1/1991	M	7.00	21.67		7.30	.00	
2-JMS099.30	10/1/1991	B	9.00	21.69	7.21	7.30	.00	
2-JMS099.30	10/10/1991	S	1.00	21.00	7.22	7.34	.00	
2-JMS099.30	10/10/1991	M	3.00	20.92		7.37	.00	
2-JMS099.30	10/10/1991	M	5.00	20.80		7.73	.00	
2-JMS099.30	10/10/1991	M	7.00	20.72		7.96	.00	
2-JMS099.30	10/10/1991	M	9.00	20.69		7.86	.00	
2-JMS099.30	10/10/1991	B	11.00	20.70	7.21	8.13	.00	
2-JMS099.30	10/28/1991	S	1.00	10.00	6.94	8.00	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	10/28/1991	M	3.00	18.20		8.05	.00	
2-JMS099.30	10/28/1991	M	5.00	18.19		8.09	.00	
2-JMS099.30	10/28/1991	M	7.00	18.19		8.14	.00	
2-JMS099.30	10/28/1991	M	9.00	18.20		8.22	.00	
2-JMS099.30	10/28/1991	B	11.00	18.17	7.02	8.29	.00	
2-JMS099.30	11/18/1991	S	1.00	9.90	7.34	10.52	.00	
2-JMS099.30	11/18/1991	M	3.00	9.72		10.78	.00	
2-JMS099.30	11/18/1991	M	5.00	9.67		10.88	.00	
2-JMS099.30	11/18/1991	M	7.00	9.64		10.95	.00	
2-JMS099.30	11/18/1991	M	9.00	9.64		11.11	.00	
2-JMS099.30	11/18/1991	B	10.00	9.64	7.55	11.45	.00	
2-JMS099.30	12/11/1991	S	1.00	9.91	7.12	10.41	.00	
2-JMS099.30	12/11/1991	M	3.00	9.86		10.40	.00	
2-JMS099.30	12/11/1991	M	5.00	9.81		10.38	.00	
2-JMS099.30	12/11/1991	M	7.00	9.81		10.81	.00	
2-JMS099.30	12/11/1991	M	9.00	9.81		10.77	.00	
2-JMS099.30	12/11/1991	B	11.00	9.81	7.26	10.77	.00	
2-JMS099.30	1/9/1992	S	1.00	7.00	7.05	13.29	.00	
2-JMS099.30	1/9/1992	M	3.00	7.00		13.19	.00	
2-JMS099.30	1/9/1992	M	5.00	7.00		13.30	.00	
2-JMS099.30	1/9/1992	M	7.00	7.00		13.51	.00	
2-JMS099.30	1/9/1992	M	9.00	6.98		13.52	.00	
2-JMS099.30	1/9/1992	B	11.00	7.00	7.11	13.41	.00	
2-JMS099.30	2/10/1992	S	1.00	5.27	7.25	12.43	.00	
2-JMS099.30	2/10/1992	M	3.00	5.26		12.43	.00	
2-JMS099.30	2/10/1992	M	5.00	5.26		12.44	.00	
2-JMS099.30	2/10/1992	M	7.00	5.26		12.44	.00	
2-JMS099.30	2/10/1992	M	9.00	5.26		12.37	.00	
2-JMS099.30	2/10/1992	B	11.00	5.26	7.05	12.37	.00	
2-JMS099.30	3/24/1992	S	1.00	8.74	7.17	11.40	.00	
2-JMS099.30	3/24/1992	M	3.00	8.72		12.25	.00	
2-JMS099.30	3/24/1992	M	5.00	8.68		12.25	.00	
2-JMS099.30	3/24/1992	M	7.00	8.68		12.19	.00	
2-JMS099.30	3/24/1992	M	9.00	8.68		12.19	.00	
2-JMS099.30	3/24/1992	B	10.00	8.68	7.14	12.14	.00	
2-JMS099.30	4/7/1992	S	1.00	10.76	7.00	11.16	.00	
2-JMS099.30	4/7/1992	M	3.00	10.72		11.13	.00	
2-JMS099.30	4/7/1992	M	5.00	10.74		11.25	.00	
2-JMS099.30	4/7/1992	M	7.00	10.74		11.36	.00	
2-JMS099.30	4/7/1992	M	9.00	10.76		11.84	.00	
2-JMS099.30	4/7/1992	B	11.00	10.81	6.85	11.80	.00	
2-JMS099.30	4/21/1992	S	1.00	19.78	7.48	8.00	.00	
2-JMS099.30	4/21/1992	M	3.00	19.77		7.98	.00	
2-JMS099.30	4/21/1992	M	5.00	19.77		7.91	.00	
2-JMS099.30	4/21/1992	M	7.00	19.74		7.95	.00	
2-JMS099.30	4/21/1992	M	9.00	19.73		7.88	.00	
2-JMS099.30	4/21/1992	B	11.00	19.75	7.43	7.95	.00	
2-JMS099.30	5/6/1992	S	1.00	18.03	7.39	8.71	.00	
2-JMS099.30	5/6/1992	M	3.00	18.01		8.72	.00	
2-JMS099.30	5/6/1992	M	5.00	17.99		8.72	.00	
2-JMS099.30	5/6/1992	M	7.00	17.98		8.72	.00	
2-JMS099.30	5/6/1992	M	9.00	17.97		8.73	.00	
2-JMS099.30	5/6/1992	M	11.00	17.96		8.73	.00	
2-JMS099.30	5/6/1992	B	12.00	17.95	7.22	8.74	.00	
2-JMS099.30	5/27/1992	S	1.00	19.39	7.33	8.39	.00	
2-JMS099.30	5/27/1992	M	3.00	19.30		8.35	.00	
2-JMS099.30	5/27/1992	M	5.00	19.27		8.37	.00	
2-JMS099.30	5/27/1992	M	7.00	19.26		8.37	.00	
2-JMS099.30	5/27/1992	M	9.00	19.26		8.37	.00	
2-JMS099.30	5/27/1992	M	11.00	19.27		8.36	.00	
2-JMS099.30	5/27/1992	B	12.00	19.29	7.19	8.39	.00	
2-JMS099.30	5/27/1992	S	.30					

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	6/18/1992	S	.30					
2-JMS099.30	6/18/1992	S	1.00	24.34	7.73	8.16	.00	
2-JMS099.30	6/18/1992	M	3.00	24.05		8.06	.00	
2-JMS099.30	6/18/1992	M	5.00	23.94		8.04	.00	
2-JMS099.30	6/18/1992	M	7.00	23.86		8.01	.00	
2-JMS099.30	6/18/1992	M	9.00	23.83		7.99	.00	
2-JMS099.30	6/18/1992	B	11.00	23.77	7.54	7.98	.00	
2-JMS099.30	7/6/1992	S	1.00	27.95	7.66	7.28	.00	
2-JMS099.30	7/6/1992	M	3.00	27.91		7.29	.00	
2-JMS099.30	7/6/1992	M	5.00	27.87		7.31	.00	
2-JMS099.30	7/6/1992	M	7.00	27.85		7.30	.00	
2-JMS099.30	7/6/1992	M	9.00	27.85		7.32	.00	
2-JMS099.30	7/6/1992	B	11.00	27.84	7.50	7.34	.00	
2-JMS099.30	7/20/1992	S	1.00	30.58	7.20	6.37	.00	
2-JMS099.30	7/20/1992	M	3.00	30.40		6.15	.00	
2-JMS099.30	7/20/1992	M	5.00	30.25		5.89	.00	
2-JMS099.30	7/20/1992	M	7.00	30.21		6.22	.00	
2-JMS099.30	7/20/1992	B	9.00	30.22	7.10	6.25	.00	
2-JMS099.30	7/20/1992	S	.30	30.50	7.20	6.30		
2-JMS099.30	9/1/1992	S	1.00	26.74	7.45	7.84	.00	
2-JMS099.30	9/1/1992	M	3.00	26.58		7.57	.00	
2-JMS099.30	9/1/1992	M	5.00	26.39		7.09	.00	
2-JMS099.30	9/1/1992	M	7.00	26.39		7.13	.00	
2-JMS099.30	9/1/1992	M	9.00	26.39		7.13	.00	
2-JMS099.30	9/1/1992	B	10.00	26.39	7.28	7.17	.00	
2-JMS099.30	9/1/1992	S	.30					
2-JMS099.30	10/8/1992	S	.30					
2-JMS099.30	10/8/1992	M	1.00	18.21	7.29	8.39	.00	
2-JMS099.30	10/8/1992	M	3.00	17.94		8.43	.00	
2-JMS099.30	10/8/1992	M	5.00	17.84		8.49	.00	
2-JMS099.30	10/8/1992	M	7.00	17.69		8.50	.00	
2-JMS099.30	10/8/1992	M	9.00	17.69		8.66	.00	
2-JMS099.30	10/8/1992	M	11.00	17.65		8.73	.00	
2-JMS099.30	10/8/1992	B	12.00	17.66	7.29	8.87	.00	
2-JMS099.30	11/2/1992	S	1.00	14.91	7.15	9.22	.00	
2-JMS099.30	11/2/1992	M	3.00	14.90		9.22	.00	
2-JMS099.30	11/2/1992	M	5.00	14.90		9.22	.00	
2-JMS099.30	11/2/1992	M	7.00	14.90		9.27	.00	
2-JMS099.30	11/2/1992	M	9.00	14.90		9.27	.00	
2-JMS099.30	11/2/1992	B	11.00	14.91	7.08	9.35	.00	
2-JMS099.30	11/17/1992	S	1.00	9.43	7.48	11.35	.00	
2-JMS099.30	11/17/1992	M	3.00	9.40		11.37	.00	
2-JMS099.30	11/17/1992	M	5.00	9.38		11.33	.00	
2-JMS099.30	11/17/1992	M	7.00	9.36		11.35	.00	
2-JMS099.30	11/17/1992	M	9.00	9.31		11.37	.00	
2-JMS099.30	11/17/1992	B	11.00	9.35	7.45	11.42	.00	
2-JMS099.30	11/17/1992	S	.30					
2-JMS099.30	12/15/1992	S	1.00	5.18	7.26	12.78	.00	
2-JMS099.30	12/15/1992	M	3.00	5.18		12.79	.00	
2-JMS099.30	12/15/1992	M	5.00	5.18		12.86	.00	
2-JMS099.30	12/15/1992	M	7.00	5.19		12.86	.00	
2-JMS099.30	12/15/1992	M	9.00	5.18		12.92	.00	
2-JMS099.30	12/15/1992	B	11.00	5.19	7.19	12.95	.00	
2-JMS099.30	12/15/1992	S	.30					
2-JMS099.30	1/14/1993	S	1.00	6.62	7.49	12.06	.00	
2-JMS099.30	1/14/1993	M	3.00	6.62		12.12	.00	
2-JMS099.30	1/14/1993	M	5.00	6.62		12.12	.00	
2-JMS099.30	1/14/1993	M	7.00	6.62		12.12	.00	
2-JMS099.30	1/14/1993	M	9.00	6.62		12.19	.00	
2-JMS099.30	1/14/1993	B	11.00	6.63	7.47	12.37	.00	
2-JMS099.30	1/14/1993	S	.30					
2-JMS099.30	2/9/1993	S	1.00	5.14	7.43	13.27	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	2/9/1993	M	3.00	5.07		13.33	.00	
2-JMS099.30	2/9/1993	M	5.00	5.06		13.34	.00	
2-JMS099.30	2/9/1993	M	7.00	5.05		13.43	.00	
2-JMS099.30	2/9/1993	M	9.00	5.02		13.50	.00	
2-JMS099.30	2/9/1993	B	10.00	5.02	7.29	13.60	.00	
2-JMS099.30	2/9/1993	S	.30					
2-JMS099.30	3/10/1993	S	1.00	7.68	7.21	11.85	.00	
2-JMS099.30	3/10/1993	M	3.00	7.67		11.87	.00	
2-JMS099.30	3/10/1993	M	5.00	7.66		11.94	.00	
2-JMS099.30	3/10/1993	M	7.00	7.67		11.93	.00	
2-JMS099.30	3/10/1993	M	9.00	7.69		12.02	.00	
2-JMS099.30	3/10/1993	B	11.00	7.70	6.90	12.20	.00	
2-JMS099.30	4/8/1993	S	1.00	10.69	7.20	11.04	.00	
2-JMS099.30	4/8/1993	M	3.00	10.67		11.04	.00	
2-JMS099.30	4/8/1993	M	5.00	10.70		11.03	.00	
2-JMS099.30	4/8/1993	M	7.00	10.69		11.04	.00	
2-JMS099.30	4/8/1993	M	9.00	10.71		11.13	.00	
2-JMS099.30	4/8/1993	B	11.00	10.74	7.10	11.20	.00	
2-JMS099.30	4/28/1993	S	1.00	16.10	7.32	9.65	.00	
2-JMS099.30	4/28/1993	M	3.00	16.05		9.63	.00	
2-JMS099.30	4/28/1993	M	5.00	15.92		9.64	.00	
2-JMS099.30	4/28/1993	M	7.00	15.94		9.68	.00	
2-JMS099.30	4/28/1993	M	9.00	15.97		9.70	.00	
2-JMS099.30	4/28/1993	B	11.00	15.97	7.25	9.82	.00	
2-JMS099.30	5/6/1993	S	1.00	21.38	7.49	8.63	.00	
2-JMS099.30	5/6/1993	M	3.00	21.19		8.59	.00	
2-JMS099.30	5/6/1993	M	5.00	21.12		8.59	.00	
2-JMS099.30	5/6/1993	M	7.00	21.09		8.86	.00	
2-JMS099.30	5/6/1993	M	9.00	21.07		8.86	.00	
2-JMS099.30	5/6/1993	B	11.00	21.07	7.33	8.93	.00	
2-JMS099.30	6/2/1993	S	1.00	23.90	7.28	7.63	.00	
2-JMS099.30	6/2/1993	M	3.00	23.91		7.62	.00	
2-JMS099.30	6/2/1993	M	5.00	23.83		7.59	.00	
2-JMS099.30	6/2/1993	M	7.00	23.73		7.59	.00	
2-JMS099.30	6/2/1993	M	9.00	23.58		7.61	.00	
2-JMS099.30	6/2/1993	B	11.00	23.52	7.18	7.66	.00	
2-JMS099.30	6/2/1993	S	.30					
2-JMS099.30	6/7/1993	S	1.00	24.43	7.24	7.88	.00	
2-JMS099.30	6/7/1993	M	3.00	24.24		7.87	.00	
2-JMS099.30	6/7/1993	M	5.00	23.98		7.78	.00	
2-JMS099.30	6/7/1993	M	7.00	23.89		7.80	.00	
2-JMS099.30	6/7/1993	M	9.00	23.86		7.85	.00	
2-JMS099.30	6/7/1993	B	10.00	23.83	7.11	7.91	.00	
2-JMS099.30	6/22/1993	S	1.00	29.83	7.60	7.23	.00	
2-JMS099.30	6/22/1993	M	3.00	29.78		7.26	.00	
2-JMS099.30	6/22/1993	M	5.00	29.75		7.25	.00	
2-JMS099.30	6/22/1993	M	7.00	29.56		7.18	.00	
2-JMS099.30	6/22/1993	M	9.00	29.56		7.15	.00	
2-JMS099.30	6/22/1993	B	10.00	29.53	7.34	7.19	.00	
2-JMS099.30	7/7/1993	S	.30					
2-JMS099.30	7/7/1993	S	1.00	31.16	7.73	8.28	.00	
2-JMS099.30	7/7/1993	M	3.00	30.46		6.60	.00	
2-JMS099.30	7/7/1993	M	5.00	30.46		6.30	.00	
2-JMS099.30	7/7/1993	M	7.00	30.48		6.34	.00	
2-JMS099.30	7/7/1993	M	9.00	30.48		6.41	.00	
2-JMS099.30	7/7/1993	B	11.00	30.49	7.22	6.35	.00	
2-JMS099.30	7/21/1993	S	1.00	30.56	7.36	6.95	.00	
2-JMS099.30	7/21/1993	B	1.00					
2-JMS099.30	7/21/1993	M	3.00	30.27		6.40	.00	
2-JMS099.30	7/21/1993	M	5.00	30.11		6.25	.00	
2-JMS099.30	7/21/1993	M	7.00	30.10		6.38	.00	
2-JMS099.30	7/21/1993	M	9.00	30.07		6.33	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	7/21/1993	M	11.00	30.04	7.19	6.35	.00	
2-JMS099.30	7/21/1993	S	.30					
2-JMS099.30	8/4/1993	S	1.00	29.14	7.43	6.88	.00	
2-JMS099.30	8/4/1993	M	3.00	29.13		6.85	.00	
2-JMS099.30	8/4/1993	M	5.00	29.09		6.79	.00	
2-JMS099.30	8/4/1993	M	7.00	29.05		6.74	.00	
2-JMS099.30	8/4/1993	M	9.00	29.04		6.73	.00	
2-JMS099.30	8/4/1993	B	11.00	29.01	7.34	6.74	.00	
2-JMS099.30	8/4/1993	S	.30					
2-JMS099.30	8/18/1993	S	1.00	29.24	7.32	7.58		
2-JMS099.30	8/18/1993	M	3.00	29.15		7.42		
2-JMS099.30	8/18/1993	M	5.00	28.99		7.27		
2-JMS099.30	8/18/1993	M	7.00	28.82		7.10		
2-JMS099.30	8/18/1993	M	9.00	28.71		6.94		
2-JMS099.30	8/18/1993	B	11.00	28.67	7.09	6.80		
2-JMS099.30	8/18/1993	S	.30					
2-JMS099.30	8/18/1993	B	1.00					
2-JMS099.30	9/2/1993	S	1.00	31.44	7.64	7.55	.00	
2-JMS099.30	9/2/1993	M	3.00	30.11		7.11	.00	
2-JMS099.30	9/2/1993	M	5.00	30.86		7.10	.00	
2-JMS099.30	9/2/1993	M	7.00	30.62		6.89	.00	
2-JMS099.30	9/2/1993	B	9.00	30.54	7.23	6.63	.00	
2-JMS099.30	9/20/1993	S	.30					
2-JMS099.30	9/20/1993	S	1.00	25.84	7.64	6.90	.00	
2-JMS099.30	9/20/1993	M	3.00	25.52		6.39	.00	
2-JMS099.30	9/20/1993	M	5.00	25.48		6.36	.00	
2-JMS099.30	9/20/1993	M	7.00	25.49		6.63	.00	
2-JMS099.30	9/20/1993	M	9.00	25.46		7.03	.00	
2-JMS099.30	9/20/1993	B	11.00	25.44	7.42	6.69	.00	
2-JMS099.30	10/5/1993	S	.30					
2-JMS099.30	10/5/1993	B	1.00					
2-JMS099.30	10/5/1993	M	1.00	20.01	8.18	8.80	.00	
2-JMS099.30	10/5/1993	M	3.00	19.85		8.72	.00	
2-JMS099.30	10/5/1993	M	5.00	19.63		8.62	.00	
2-JMS099.30	10/5/1993	M	7.00	19.61		8.63	.00	
2-JMS099.30	10/5/1993	M	9.00	19.60		8.67	.00	
2-JMS099.30	10/5/1993	M	11.00	19.59	8.13	8.67	.00	
2-JMS099.30	11/17/1993	S	.30					
2-JMS099.30	11/17/1993	B	1.00					
2-JMS099.30	12/2/1993	S	.30					
2-JMS099.30	12/2/1993	B	.30					
2-JMS099.30	12/2/1993	M	1.00	8.30	6.96	11.63	.00	
2-JMS099.30	12/2/1993	M	3.00	8.27		11.71	.00	
2-JMS099.30	12/2/1993	M	5.00	8.20		11.75	.00	
2-JMS099.30	12/2/1993	M	7.00	8.18		11.82	.00	
2-JMS099.30	12/2/1993	M	9.00	8.22		11.86	.00	
2-JMS099.30	12/2/1993	M	11.00	8.21	6.78	11.90	.00	
2-JMS099.30	2/17/1994	S	1.00	4.33	7.34	13.01	.00	
2-JMS099.30	2/17/1994	M	3.00	4.34		12.99	.00	
2-JMS099.30	2/17/1994	M	5.00	4.33		12.98	.00	
2-JMS099.30	2/17/1994	M	7.00	4.33		12.93	.00	
2-JMS099.30	2/17/1994	M	9.00	4.34		12.89	.00	
2-JMS099.30	2/17/1994	B	10.00	4.34	7.30	12.87	.00	
2-JMS099.30	3/21/1994	S	1.00	9.49	7.54	11.10	.00	
2-JMS099.30	3/21/1994	M	3.00	9.45		11.05	.00	
2-JMS099.30	3/21/1994	M	5.00	9.45		11.05	.00	
2-JMS099.30	3/21/1994	M	7.00	9.44		11.05	.00	
2-JMS099.30	3/21/1994	M	9.00	9.44		11.07	.00	
2-JMS099.30	3/21/1994	B	10.00	9.44	7.52	11.10	.00	
2-JMS099.30	4/14/1994	S	1.00	16.66	7.67	9.60	.00	
2-JMS099.30	4/14/1994	M	3.00	16.51		9.58	.00	
2-JMS099.30	4/14/1994	M	5.00	16.30		9.59	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	4/14/1994	M	7.00	16.30		9.65	.00	
2-JMS099.30	4/14/1994	M	9.00	16.30		9.73	.00	
2-JMS099.30	4/14/1994	B	11.00	16.35	7.43	9.70	.00	
2-JMS099.30	5/23/1994	S	1.00	19.49	8.94	10.21	.00	
2-JMS099.30	5/23/1994	M	3.00	19.15		9.68	.00	
2-JMS099.30	5/23/1994	M	5.00	19.16		9.66	.00	
2-JMS099.30	5/23/1994	M	7.00	19.23		9.77	.00	
2-JMS099.30	5/23/1994	M	9.00	19.10		9.50	.00	
2-JMS099.30	5/23/1994	B	11.00	19.08	8.72	9.52	.00	
2-JMS099.30	6/9/1994	S	1.00	26.16	7.63	7.35	.00	
2-JMS099.30	6/9/1994	M	3.00	25.93		6.93	.00	
2-JMS099.30	6/9/1994	M	5.00	25.86		6.41	.00	
2-JMS099.30	6/9/1994	M	7.00	25.80		6.24	.00	
2-JMS099.30	6/9/1994	M	9.00	25.70		6.11	.00	
2-JMS099.30	6/9/1994	M	11.00	25.66		6.09	.00	
2-JMS099.30	6/9/1994	B	12.00	25.65	7.34	6.13	.00	
2-JMS099.30	6/28/1994	S	.30	29.55	8.34	9.36		
2-JMS099.30	7/7/1994	S	1.00	31.85	7.83	8.36	.00	
2-JMS099.30	7/7/1994	M	3.00	30.89		7.50	.00	
2-JMS099.30	7/7/1994	M	5.00	30.54		7.37	.00	
2-JMS099.30	7/7/1994	M	7.00	30.04		6.90	.00	
2-JMS099.30	7/7/1994	M	9.00	29.86		6.81	.00	
2-JMS099.30	7/7/1994	M	11.00	29.86		6.78	.00	
2-JMS099.30	7/7/1994	B	12.00	29.84	7.33	6.76	.00	
2-JMS099.30	7/14/1994	S	.30	30.58	7.33	6.31		
2-JMS099.30	7/28/1994	S	.30	29.20	7.39	6.30		
2-JMS099.30	8/11/1994	S	1.00	27.60	7.72	8.19	.00	
2-JMS099.30	8/11/1994	M	3.00	27.43		7.98	.00	
2-JMS099.30	8/11/1994	M	5.00	27.14		7.68	.00	
2-JMS099.30	8/11/1994	M	7.00	27.06		7.58	.00	
2-JMS099.30	8/11/1994	M	9.00	27.01		7.58	.00	
2-JMS099.30	8/11/1994	B	11.00	27.00	7.57	7.61	.00	
2-JMS099.30	8/18/1994	S	.30	26.47	7.47	7.12		
2-JMS099.30	8/30/1994	S	.30	27.67	7.77	7.90		
2-JMS099.30	9/8/1994	S	12.00	24.17	7.93	8.25	.00	
2-JMS099.30	9/8/1994	S	1.00	24.35	8.10	8.68	.00	
2-JMS099.30	9/8/1994	M	3.00	24.28		8.33	.00	
2-JMS099.30	9/8/1994	M	5.00	24.25		8.28	.00	
2-JMS099.30	9/8/1994	M	7.00	24.23		8.28	.00	
2-JMS099.30	9/8/1994	M	9.00	24.21		8.25	.00	
2-JMS099.30	9/8/1994	B	11.00	24.21		8.25	.00	
2-JMS099.30	9/13/1994	S	.30	25.55	8.15	8.86		
2-JMS099.30	9/26/1994	S	.30	21.80	7.50	7.93		
2-JMS099.30	10/12/1994	S	.30	18.60	7.88	8.90		
2-JMS099.30	10/17/1994	S	10.00	16.72	7.75	7.87		
2-JMS099.30	10/17/1994	S	1.00	17.41	7.87	8.82		
2-JMS099.30	10/17/1994	M	3.00	16.94		8.71		
2-JMS099.30	10/17/1994	M	5.00	16.95		8.68		
2-JMS099.30	10/17/1994	M	7.00	16.73		8.47		
2-JMS099.30	10/17/1994	B	9.00	16.73		8.27		
2-JMS099.30	10/25/1994	S	.30	17.16	7.71	9.22		
2-JMS099.30	11/30/1994	S	11.00	9.14	7.36	10.82	.00	
2-JMS099.30	11/30/1994	S	1.00	9.30	7.38	10.88	.00	
2-JMS099.30	11/30/1994	M	3.00	9.24		10.85	.00	
2-JMS099.30	11/30/1994	M	5.00	9.19		10.84	.00	
2-JMS099.30	11/30/1994	M	7.00	9.17		10.83	.00	
2-JMS099.30	11/30/1994	B	9.00	9.12		10.82	.00	
2-JMS099.30	12/6/1994	S	10.00	9.12	7.55	10.51	.00	
2-JMS099.30	12/6/1994	S	1.00	9.37	7.52	11.17	.00	
2-JMS099.30	12/6/1994	M	3.00	9.43		11.15	.00	
2-JMS099.30	12/6/1994	M	5.00	9.37		11.23	.00	
2-JMS099.30	12/6/1994	M	7.00	9.12		11.28	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	12/6/1994	B	9.00	9.12		10.61	.00	
2-JMS099.30	1/25/1995	S	11.00	5.30	7.54	12.80	.00	
2-JMS099.30	1/25/1995	S	1.00	5.25	7.60	12.73	.00	
2-JMS099.30	1/25/1995	M	3.00	5.26		12.75	.00	
2-JMS099.30	1/25/1995	M	5.00	5.27		12.77	.00	
2-JMS099.30	1/25/1995	M	7.00	5.26		12.75	.00	
2-JMS099.30	1/25/1995	B	9.00	5.27		12.78	.00	
2-JMS099.30	2/27/1995	S	11.00	7.89	7.65	11.84	.00	
2-JMS099.30	2/27/1995	S	1.00	8.50	7.72	11.90	.00	
2-JMS099.30	2/27/1995	M	3.00	8.07		11.90	.00	
2-JMS099.30	2/27/1995	M	5.00	7.96		11.89	.00	
2-JMS099.30	2/27/1995	M	7.00	7.92		11.89	.00	
2-JMS099.30	2/27/1995	B	9.00	7.91		11.88	.00	
2-JMS099.30	3/23/1995	S	1.00	14.56	7.67	10.26	.00	
2-JMS099.30	3/23/1995	M	3.00	14.58		10.27	.00	
2-JMS099.30	3/23/1995	M	5.00	14.56		10.25	.00	
2-JMS099.30	3/23/1995	M	7.00	14.54		10.25	.00	
2-JMS099.30	3/23/1995	B	9.00	14.54		10.24	.00	
2-JMS099.30	3/23/1995	S	10.00	14.56	7.65	10.21	.00	
2-JMS099.30	4/18/1995	S	1.00	16.90	7.73	9.40	.00	
2-JMS099.30	4/18/1995	M	3.00	16.78		9.39	.00	
2-JMS099.30	4/18/1995	M	5.00	16.73		9.34	.00	
2-JMS099.30	4/18/1995	M	7.00	16.73		9.33	.00	
2-JMS099.30	4/18/1995	B	9.00	16.53		9.29	.00	
2-JMS099.30	4/18/1995	S	11.00	16.53	7.62	9.27	.00	
2-JMS099.30	5/3/1995	S	.30	15.81	7.25	8.81		
2-JMS099.30	5/18/1995	S	.30	21.22	7.19	7.92		
2-JMS099.30	5/23/1995	S	1.00	24.30	7.60	8.40	.00	
2-JMS099.30	5/23/1995	S	11.00	23.22	7.35	8.21	.00	
2-JMS099.30	6/1/1995	S	.30	24.51	7.36	8.42		
2-JMS099.30	6/20/1995	S	1.00	24.88	7.33	7.88	.00	
2-JMS099.30	6/20/1995	M	3.00	24.49		7.74	.00	
2-JMS099.30	6/20/1995	M	5.00	24.51		7.77	.00	
2-JMS099.30	6/20/1995	M	7.00	24.50		7.68	.00	
2-JMS099.30	6/20/1995	M	9.00	24.40		7.60	.00	
2-JMS099.30	6/20/1995	B	11.00	24.40		7.53	.00	
2-JMS099.30	6/20/1995	S	12.00	24.36	7.25	7.38	.00	
2-JMS099.30	7/18/1995	S	1.00	29.95	7.30	7.31	.00	
2-JMS099.30	7/18/1995	M	3.00	29.87		7.19	.00	
2-JMS099.30	7/18/1995	M	5.00	29.52		6.92	.00	
2-JMS099.30	7/18/1995	M	7.00	29.45		6.84	.00	
2-JMS099.30	7/18/1995	B	9.00	29.45		6.76	.00	
2-JMS099.30	7/18/1995	S	11.00	29.45	7.28	6.78	.00	
2-JMS099.30	7/31/1995	S	.30	31.35	7.89	5.84	.00	
2-JMS099.30	8/23/1995	S	1.00	32.11	8.23	8.68	.00	
2-JMS099.30	8/23/1995	M	3.00	30.78		7.25	.00	
2-JMS099.30	8/23/1995	M	5.00	29.60		7.08	.00	
2-JMS099.30	8/23/1995	M	7.00	29.50		6.89	.00	
2-JMS099.30	8/23/1995	M	9.00	29.41		6.77	.00	
2-JMS099.30	8/23/1995	B	11.00	29.40		6.73	.00	
2-JMS099.30	8/23/1995	S	12.00	29.37	7.65	6.75	.00	
2-JMS099.30	8/28/1995	S	.30	28.60	7.48	7.17		
2-JMS099.30	9/11/1995	S	.30	26.77	7.66	8.87		
2-JMS099.30	9/20/1995	S	.30					
2-JMS099.30	9/21/1995	S	1.00	25.14	7.82	7.74	.00	
2-JMS099.30	9/21/1995	M	3.00	23.92		7.27	.00	
2-JMS099.30	9/21/1995	M	5.00	23.77		7.22	.00	
2-JMS099.30	9/21/1995	M	7.00	23.55		7.12	.00	
2-JMS099.30	9/21/1995	M	9.00	23.47		7.08	.00	
2-JMS099.30	9/21/1995	B	11.00	23.48		7.05	.00	
2-JMS099.30	9/21/1995	S	12.00	23.48	7.54	7.05	.00	
2-JMS099.30	10/5/1995	S	.30	21.67	7.69	7.95		

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	10/19/1995	S	1.00	18.30	7.42	8.72	.00	
2-JMS099.30	10/19/1995	M	3.00	18.05		8.70	.00	
2-JMS099.30	10/19/1995	M	5.00	17.90		8.70	.00	
2-JMS099.30	10/19/1995	M	7.00	17.84		8.69	.00	
2-JMS099.30	10/19/1995	B	9.00	17.69	7.42	8.66	.00	
2-JMS099.30	10/19/1995	S	12.00					
2-JMS099.30	10/24/1995	S	.30	15.22	7.14	9.86		
2-JMS099.30	11/20/1995	S	1.00	6.64	7.37	12.22	.00	
2-JMS099.30	11/20/1995	M	3.00	6.65		12.21	.00	
2-JMS099.30	11/20/1995	M	5.00	6.65		12.24	.00	
2-JMS099.30	11/20/1995	M	7.00	6.63		12.25	.00	
2-JMS099.30	11/20/1995	B	9.00	6.63		12.25	.00	
2-JMS099.30	11/20/1995	S	11.00	6.61	7.36	11.75	.00	
2-JMS099.30	12/14/1995	S	1.00	2.82	7.33	13.61	.00	
2-JMS099.30	12/14/1995	M	3.00	2.82		13.58	.00	
2-JMS099.30	12/14/1995	M	5.00	2.82		13.57	.00	
2-JMS099.30	12/14/1995	M	7.00	2.80		13.52	.00	
2-JMS099.30	12/14/1995	B	9.00	2.80		13.52	.00	
2-JMS099.30	12/14/1995	S	10.00	2.81	7.33	13.52	.00	
2-JMS099.30	1/29/1996	S	11.00	4.32	7.27	13.28	.00	
2-JMS099.30	1/29/1996	S	1.00	4.33	7.29	13.11	.00	
2-JMS099.30	1/29/1996	M	3.00	4.33		13.20	.00	
2-JMS099.30	1/29/1996	M	5.00	4.33		13.25	.00	
2-JMS099.30	1/29/1996	M	7.00	4.33		13.27	.00	
2-JMS099.30	1/29/1996	B	9.00	4.35		13.30	.00	
2-JMS099.30	2/20/1996	S	1.00	3.86	7.43	13.36	.00	
2-JMS099.30	2/20/1996	M	3.00	3.81		13.40	.00	
2-JMS099.30	2/20/1996	M	5.00	3.81		13.40	.00	
2-JMS099.30	2/20/1996	M	7.00	3.81		13.40	.00	
2-JMS099.30	2/20/1996	B	9.00	3.81		13.43	.00	
2-JMS099.30	2/20/1996	S	11.00	3.78	7.39	13.50	.00	
2-JMS099.30	3/25/1996	S	10.00	8.75	7.22	11.45	.00	
2-JMS099.30	3/25/1996	S	1.00	8.81	7.24	11.63	.00	
2-JMS099.30	3/25/1996	M	3.00	8.76		11.62	.00	
2-JMS099.30	3/25/1996	M	5.00	8.75		11.57	.00	
2-JMS099.30	3/25/1996	M	7.00	8.75		11.48	.00	
2-JMS099.30	3/25/1996	B	9.00	8.75		11.43	.00	
2-JMS099.30	4/29/1996	S	10.00	17.80	7.59	8.98	.00	
2-JMS099.30	4/29/1996	S	1.00	18.45	8.08	9.45	.00	
2-JMS099.30	4/29/1996	M	3.00	18.01		9.03	.00	
2-JMS099.30	4/29/1996	M	5.00	17.95		9.03	.00	
2-JMS099.30	4/29/1996	M	7.00	17.94		9.00	.00	
2-JMS099.30	4/29/1996	B	9.00	17.82		8.96	.00	
2-JMS099.30	5/6/1996	S	.30	22.00	8.82	8.62		
2-JMS099.30	5/15/1996	S	10.00	19.83	7.88	9.74	.00	
2-JMS099.30	5/15/1996	S	1.00	20.16	8.32	10.30	.00	
2-JMS099.30	5/15/1996	M	3.00	20.00		10.17	.00	
2-JMS099.30	5/15/1996	M	5.00	19.88		10.01	.00	
2-JMS099.30	5/15/1996	M	7.00	19.86		9.94	.00	
2-JMS099.30	5/15/1996	B	9.00	19.83		9.85	.00	
2-JMS099.30	5/28/1996	S	.30	19.89	7.43	8.86		
2-JMS099.30	6/3/1996	S	.30	21.47	7.97	9.31		
2-JMS099.30	6/12/1996	S	.30	24.68	7.19	7.90		
2-JMS099.30	6/18/1996	S	1.00	27.97	7.51	7.60	.00	
2-JMS099.30	6/18/1996	M	3.00	27.97		7.60	.00	
2-JMS099.30	6/18/1996	M	5.00	27.65		7.45	.00	
2-JMS099.30	6/18/1996	M	7.00	27.63		7.46	.00	
2-JMS099.30	6/18/1996	B	9.00	27.61		7.43	.00	
2-JMS099.30	6/18/1996	S	11.00	27.53	7.38	7.39		
2-JMS099.30	6/18/1996	B	12.00	27.53	7.38	7.39	.00	
2-JMS099.30	7/1/1996	S	.30	27.97	7.90	7.09		
2-JMS099.30	7/15/1996	S	.30	27.01	7.30	7.06		

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	7/23/1996	S	11.00	28.16	7.21	6.38	.00	
2-JMS099.30	7/23/1996	S	1.00	28.45	7.42	6.79	.00	
2-JMS099.30	7/23/1996	M	3.00	28.40		6.67	.00	
2-JMS099.30	7/23/1996	M	5.00	28.30		6.50	.00	
2-JMS099.30	7/23/1996	M	7.00	28.20		6.40	.00	
2-JMS099.30	7/23/1996	B	9.00	28.18		6.41	.00	
2-JMS099.30	8/1/1996	S	.30	28.05	7.49	6.94		
2-JMS099.30	8/15/1996	S	.30	24.91	7.41	7.91		
2-JMS099.30	8/20/1996	S	1.00	27.32	7.55	7.47	.00	
2-JMS099.30	8/20/1996	M	3.00	26.98		7.27	.00	
2-JMS099.30	8/20/1996	M	5.00	26.97		7.27	.00	
2-JMS099.30	8/20/1996	M	7.00	26.96		7.25	.00	
2-JMS099.30	8/20/1996	M	9.00	26.96		7.25	.00	
2-JMS099.30	8/20/1996	B	11.00	26.96		7.24	.00	
2-JMS099.30	8/20/1996	S	12.00	26.95	7.47	7.24	.00	
2-JMS099.30	9/16/1996	S	.30	22.25	7.62	8.00		
2-JMS099.30	9/24/1996	S	12.00	20.41	7.69	8.54	.00	
2-JMS099.30	9/24/1996	S	1.00	20.87	7.78	8.62	.00	
2-JMS099.30	9/24/1996	M	3.00	20.64		8.61	.00	
2-JMS099.30	9/24/1996	M	5.00	20.52		8.58	.00	
2-JMS099.30	9/24/1996	M	7.00	20.43		8.56	.00	
2-JMS099.30	9/24/1996	M	9.00	20.40		8.54	.00	
2-JMS099.30	9/24/1996	B	11.00	20.40		8.54	.00	
2-JMS099.30	9/30/1996	S	.30	21.74	7.92	8.10		
2-JMS099.30	10/9/1996	S	.30	15.82	7.34	9.23		
2-JMS099.30	10/22/1996	S	1.00	15.06	7.14	9.42	.00	
2-JMS099.30	10/22/1996	M	3.00	14.54		9.44	.00	
2-JMS099.30	10/22/1996	M	5.00	14.45		9.43	.00	
2-JMS099.30	10/22/1996	M	7.00	14.45		9.40	.00	
2-JMS099.30	10/22/1996	M	9.00	14.45		9.41	.00	
2-JMS099.30	10/22/1996	B	11.00	14.45		9.41	.00	
2-JMS099.30	10/22/1996	S	12.00	14.45	7.13	9.41	.00	
2-JMS099.30	10/30/1996	S	.30	17.11	7.88	10.05		
2-JMS099.30	11/19/1996	S	11.00	6.04	7.38	12.33	.00	
2-JMS099.30	11/19/1996	S	1.00	6.04	7.44	12.33	.00	
2-JMS099.30	11/19/1996	M	3.00	6.02		12.35	.00	
2-JMS099.30	11/19/1996	M	5.00	6.02		12.33	.00	
2-JMS099.30	11/19/1996	M	7.00	6.02		12.34	.00	
2-JMS099.30	11/19/1996	B	9.00	6.04		12.33	.00	
2-JMS099.30	12/10/1996	S	12.00	5.14	6.98	12.40	.00	
2-JMS099.30	12/10/1996	S	1.00	5.14	7.12	12.56	.00	
2-JMS099.30	12/10/1996	M	3.00	5.14		12.57	.00	
2-JMS099.30	12/10/1996	M	5.00	5.14		12.63	.00	
2-JMS099.30	12/10/1996	M	7.00	5.14		12.61	.00	
2-JMS099.30	12/10/1996	M	9.00	5.14		12.61	.00	
2-JMS099.30	12/10/1996	B	11.00	5.14		12.47	.00	
2-JMS099.30	2/18/1997	S	3.00	5.71		13.58	.00	
2-JMS099.30	2/18/1997	M	5.00	5.69		13.66	.00	
2-JMS099.30	2/18/1997	M	7.00	5.69		13.67	.00	
2-JMS099.30	2/18/1997	M	9.00	5.69		13.73	.00	
2-JMS099.30	2/18/1997	B	11.00	5.71	7.24	14.08	.00	
2-JMS099.30	2/18/1997	S	1.00	5.74	7.24	13.57	.00	
2-JMS099.30	3/18/1997	S	10.00	10.07	7.65	11.28	.00	
2-JMS099.30	3/18/1997	S	1.00	10.15	7.71	11.09	.00	
2-JMS099.30	3/18/1997	M	3.00	10.14		11.10	.00	
2-JMS099.30	3/18/1997	M	5.00	10.09		11.13	.00	
2-JMS099.30	3/18/1997	M	7.00	10.07		11.15	.00	
2-JMS099.30	3/18/1997	B	9.00	10.07		11.24	.00	
2-JMS099.30	4/22/1997	S	1.00	14.04	7.61	9.75	.00	
2-JMS099.30	4/22/1997	M	3.00	14.01		9.73	.00	
2-JMS099.30	4/22/1997	M	5.00	13.99		9.73	.00	
2-JMS099.30	4/22/1997	M	7.00	13.98		9.74	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	4/22/1997	B	9.00	13.98		9.76	.00	
2-JMS099.30	4/22/1997	S	10.00	13.98	7.50	9.78	.00	
2-JMS099.30	5/21/1997	S	.30	22.10	7.34	7.18		
2-JMS099.30	5/27/1997	S	.30	21.94	7.32	7.02		
2-JMS099.30	5/28/1997	S	1.00	21.72	7.27	7.13	.00	
2-JMS099.30	5/28/1997	M	3.00	21.62		7.14	.00	
2-JMS099.30	5/28/1997	M	5.00	21.57		7.15	.00	
2-JMS099.30	5/28/1997	M	7.00	21.44		7.17	.00	
2-JMS099.30	5/28/1997	M	9.00	21.28		7.15	.00	
2-JMS099.30	5/28/1997	B	11.00	21.27		7.16	.00	
2-JMS099.30	5/28/1997	S	12.00	21.27	7.23	7.19	.00	
2-JMS099.30	6/3/1997	S	.30	22.37	7.07	6.92		
2-JMS099.30	6/23/1997	S	.30	28.76	7.76	6.80		
2-JMS099.30	6/24/1997	S	1.00	30.26	7.93	6.76	.00	
2-JMS099.30	6/24/1997	M	3.00	29.37		6.31	.00	
2-JMS099.30	6/24/1997	M	5.00	29.35		6.31	.00	
2-JMS099.30	6/24/1997	M	7.00	29.31		6.31	.00	
2-JMS099.30	6/24/1997	B	9.00	29.31		6.32	.00	
2-JMS099.30	6/24/1997	S	10.00	29.31	7.70	6.33	.00	
2-JMS099.30	7/9/1997	S	.30	29.33	7.67	6.87		
2-JMS099.30	7/15/1997	S	1.00	30.53	8.45			
2-JMS099.30	7/15/1997	S	11.00	28.91	7.60			
2-JMS099.30	7/23/1997	S	.30	29.30	7.42			
2-JMS099.30	8/7/1997	S	.30	28.42	7.47	6.27		
2-JMS099.30	8/19/1997	S	1.00	30.83	7.49	6.58	.00	
2-JMS099.30	8/19/1997	S	11.00	30.30	7.38	6.25	.00	
2-JMS099.30	8/21/1997	S	.30	29.60	7.38	6.70		
2-JMS099.30	9/4/1997	S	.30	26.36	7.75	7.00		
2-JMS099.30	9/23/1997	S	1.00	24.74	7.76	7.67	.00	
2-JMS099.30	9/23/1997	S	11.00	24.46	7.59	7.37	.00	
2-JMS099.30	10/2/1997	S	.30	21.31	7.66	8.00		
2-JMS099.30	10/20/1997	S	.30	16.89	7.61	8.51		
2-JMS099.30	10/21/1997	S	1.00	16.12	7.68	9.02	.00	
2-JMS099.30	10/21/1997	B	3.00	16.07		9.00		
2-JMS099.30	10/21/1997	S	9.00	16.07	7.67	9.04	.00	
2-JMS099.30	11/18/1997	S	1.00	7.97	7.56	11.44		
2-JMS099.30	11/18/1997	S	11.00	7.89	7.53	11.39		
2-JMS099.30	12/10/1997	S	1.00	5.86	7.62	10.92		
2-JMS099.30	12/10/1997	M	3.00	5.86		10.90	.00	
2-JMS099.30	12/10/1997	B	5.00	5.86		10.90	.00	
2-JMS099.30	12/10/1997	S	7.00	5.95	7.61	10.88		
2-JMS099.30	1/21/1998	S	1.00	5.56	7.81	11.16		
2-JMS099.30	1/21/1998	M	3.00	5.56		11.18		
2-JMS099.30	1/21/1998	M	5.00	5.55		11.19		
2-JMS099.30	1/21/1998	M	7.00	5.56		11.16		
2-JMS099.30	1/21/1998	M	9.00	5.57		11.17		
2-JMS099.30	1/21/1998	B	11.00	5.57		11.20		
2-JMS099.30	1/21/1998	S	12.00	5.56	7.80	11.25		
2-JMS099.30	2/18/1998	S	1.00	7.24	7.20	11.96		
2-JMS099.30	2/18/1998	M	3.00	7.24		11.96		
2-JMS099.30	2/18/1998	M	5.00	7.24		11.96		
2-JMS099.30	2/18/1998	M	7.00	7.24		11.95		
2-JMS099.30	2/18/1998	M	9.00	7.24		11.97		
2-JMS099.30	2/18/1998	B	11.00	7.24		11.96		
2-JMS099.30	2/18/1998	S	12.00	7.24	7.20	12.03	.00	
2-JMS099.30	3/17/1998	S	1.00	6.93	7.57	12.85		
2-JMS099.30	3/17/1998	M	3.00	6.93		12.83		
2-JMS099.30	3/17/1998	B	5.00	6.91		12.84		
2-JMS099.30	3/17/1998	S	7.00	6.91	7.57	12.81		
2-JMS099.30	4/21/1998	S	1.00	14.58	7.43	10.90		
2-JMS099.30	4/21/1998	M	3.00	14.57		10.90		
2-JMS099.30	4/21/1998	M	5.00	14.57		10.90		

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	4/21/1998	B	7.00	14.57		10.90		
2-JMS099.30	4/21/1998	S	9.00	14.57		10.90		
2-JMS099.30	4/21/1998	B	10.00	14.57	7.40	10.90		
2-JMS099.30	5/18/1998	S	.30	22.17	7.87	8.46		
2-JMS099.30	5/19/1998	S	1.00	23.27	7.74	8.56		
2-JMS099.30	5/19/1998	M	3.00	22.96		8.46		
2-JMS099.30	5/19/1998	M	5.00	22.71		8.46		
2-JMS099.30	5/19/1998	B	7.00	22.68		8.47		
2-JMS099.30	5/19/1998	S	9.00	22.66	7.66	8.52		
2-JMS099.30	5/27/1998	S	.30	24.21	8.35	8.61		
2-JMS099.30	6/17/1998	S	.30	25.75	7.66	7.53		
2-JMS099.30	6/23/1998	S	14.00	27.28	7.78	7.69		
2-JMS099.30	6/23/1998	S	1.00	28.00	8.14	8.75		
2-JMS099.30	6/23/1998	M	3.00	27.73		8.68		
2-JMS099.30	6/23/1998	M	5.00	27.56		8.03		
2-JMS099.30	6/23/1998	M	7.00	27.43		7.98		
2-JMS099.30	6/23/1998	M	9.00	27.34		7.80		
2-JMS099.30	6/23/1998	M	11.00	27.31		7.73		
2-JMS099.30	6/23/1998	B	13.00	27.79		7.69		
2-JMS099.30	6/30/1998	S	.30	29.45	7.50	6.94		
2-JMS099.30	7/14/1998	S	.30	28.40	7.75	8.50		
2-JMS099.30	7/21/1998	S	1.00	33.07	8.60	8.90		
2-JMS099.30	7/21/1998	M	3.00	31.02		7.45		
2-JMS099.30	7/21/1998	M	5.00	30.65		7.25		
2-JMS099.30	7/21/1998	M	7.00	30.39		7.00		
2-JMS099.30	7/21/1998	M	9.00	30.04		6.75		
2-JMS099.30	7/21/1998	B	11.00	30.02		6.68		
2-JMS099.30	7/21/1998	S	12.00	30.00	8.01	6.65		
2-JMS099.30	7/28/1998	S	.30	29.73	7.80	7.62		
2-JMS099.30	8/11/1998	S	.30	28.61	7.66	7.21		
2-JMS099.30	8/18/1998	S	10.00	28.30	7.62	6.43	.00	
2-JMS099.30	8/18/1998	S	1.00	28.73	7.73	6.80		
2-JMS099.30	8/18/1998	M	3.00	28.66		6.82		
2-JMS099.30	8/18/1998	M	5.00	28.44		6.71		
2-JMS099.30	8/18/1998	M	7.00	28.31		6.57		
2-JMS099.30	8/18/1998	B	9.00	28.30		6.49		
2-JMS099.30	8/25/1998	S	.30	28.26	8.13	7.40		
2-JMS099.30	9/14/1998	S	.30	28.45	8.30	9.37		
2-JMS099.30	9/22/1998	S	1.00	28.75	7.87	7.10	.00	
2-JMS099.30	9/22/1998	M	3.00	28.40		6.85		
2-JMS099.30	9/22/1998	M	5.00	28.00		6.64		
2-JMS099.30	9/22/1998	M	7.00	27.95		6.55		
2-JMS099.30	9/22/1998	B	9.00	27.88		6.59		
2-JMS099.30	9/22/1998	S	11.00	27.79	7.69	6.48	.00	
2-JMS099.30	9/29/1998	S	.30	28.91	8.24	8.31		
2-JMS099.30	10/13/1998	S	.30	20.28	7.86	8.40		
2-JMS099.30	10/20/1998	S	9.00	19.92	7.70	8.20		
2-JMS099.30	10/20/1998	S	1.00	20.75	7.76	8.47		
2-JMS099.30	10/20/1998	M	3.00	20.85		8.41		
2-JMS099.30	10/20/1998	M	5.00	20.75		8.41		
2-JMS099.30	10/20/1998	B	7.00	20.61		8.38		
2-JMS099.30	10/26/1998	S	.30	17.80	7.76	8.90		
2-JMS099.30	11/18/1998	S	1.00	13.81	7.54	10.49	.20	
2-JMS099.30	11/18/1998	M	3.00	12.57		10.51	.20	
2-JMS099.30	11/18/1998	M	5.00	12.41		10.51	.20	
2-JMS099.30	11/18/1998	M	7.00	12.28		10.53	.20	
2-JMS099.30	11/18/1998	M	9.00	12.29		10.52	.20	
2-JMS099.30	11/18/1998	B	11.00	12.23		10.55	.20	
2-JMS099.30	11/18/1998	S	12.00	12.21	7.53	10.56	.20	
2-JMS099.30	12/15/1998	S	9.00	9.82		11.32		
2-JMS099.30	12/15/1998	B	11.00	9.82		11.46		
2-JMS099.30	12/15/1998	S	12.00	9.82	7.17	11.46		

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	12/15/1998	S	1.00	10.18	7.21	11.20		
2-JMS099.30	12/15/1998	M	3.00	10.00		11.27		
2-JMS099.30	12/15/1998	M	5.00	9.83		11.00		
2-JMS099.30	12/15/1998	B	7.00	9.82		11.22		
2-JMS099.30	1/19/1999	S	1.00	6.09	7.33	12.26		
2-JMS099.30	1/19/1999	M	3.00	6.05		12.27		
2-JMS099.30	1/19/1999	M	5.00	6.02		12.29		
2-JMS099.30	1/19/1999	M	7.00	6.00		12.31		
2-JMS099.30	1/19/1999	M	9.00	6.00		12.31		
2-JMS099.30	1/19/1999	B	10.00	6.05	7.34	12.35		
2-JMS099.30	2/23/1999	B	10.00	6.20	7.61	12.70		
2-JMS099.30	2/23/1999	S	1.00	6.32	7.73	12.65	.00	
2-JMS099.30	2/23/1999	M	3.00	6.28		12.65		
2-JMS099.30	2/23/1999	M	5.00	6.26		12.78		
2-JMS099.30	2/23/1999	M	7.00	6.21		12.79		
2-JMS099.30	2/23/1999	M	9.00	6.24		12.70		
2-JMS099.30	3/23/1999	S	1.00	9.52	7.10	11.12		
2-JMS099.30	3/23/1999	M	3.00	9.55		11.06		
2-JMS099.30	3/23/1999	M	5.00	9.54		11.11		
2-JMS099.30	3/23/1999	M	7.00	9.51		11.14		
2-JMS099.30	3/23/1999	M	9.00	9.51		11.08		
2-JMS099.30	3/23/1999	B	10.00					
2-JMS099.30	4/20/1999	B	9.00	16.11	7.58	8.59	.10	
2-JMS099.30	4/20/1999	S	1.00	16.41	7.75	8.79	.10	
2-JMS099.30	4/20/1999	M	3.00	16.31		8.64	.10	
2-JMS099.30	4/20/1999	M	5.00	16.32		8.64	.10	
2-JMS099.30	4/20/1999	M	7.00	16.29		8.70	.10	
2-JMS099.30	5/11/1999	S	.30					
2-JMS099.30	5/20/1999	B	8.00	21.88	7.43	8.00		
2-JMS099.30	5/20/1999	S	1.00	22.08	7.45	8.00		
2-JMS099.30	5/20/1999	M	3.00	21.96		8.00		
2-JMS099.30	5/20/1999	M	5.00	21.92		8.01		
2-JMS099.30	5/20/1999	M	7.00	21.86		8.00		
2-JMS099.30	5/25/1999	S	.30	23.97	7.24	6.64		
2-JMS099.30	6/7/1999	S	.30	28.88	8.81	10.20		
2-JMS099.30	6/21/1999	S	.30	24.58	6.98	5.45		
2-JMS099.30	6/22/1999	B	9.00	23.63	7.05	6.34	.00	
2-JMS099.30	6/22/1999	S	1.00	24.40	7.19	7.19		
2-JMS099.30	6/22/1999	M	3.00	24.28		7.03		
2-JMS099.30	6/22/1999	M	5.00	23.77		6.46		
2-JMS099.30	6/22/1999	M	7.00	23.73		6.44		
2-JMS099.30	7/7/1999	S	.30	34.67	8.05	7.89		
2-JMS099.30	7/20/1999	S	1.00	30.36	8.30	10.42		
2-JMS099.30	7/20/1999	M	3.00	29.94		9.71		
2-JMS099.30	7/20/1999	M	5.00	29.50		9.03		
2-JMS099.30	7/20/1999	M	7.00	29.16		8.62		
2-JMS099.30	7/20/1999	B	8.00	29.15	7.75	8.60		
2-JMS099.30	7/21/1999	S	.30	31.57	7.95	7.95		
2-JMS099.30	8/10/1999	S	.30	31.80	7.89	7.05		
2-JMS099.30	8/17/1999	S	1.00	31.36	8.06	9.14	.20	
2-JMS099.30	8/17/1999	M	3.00	30.57		7.92	.20	
2-JMS099.30	8/17/1999	M	5.00	30.31		7.30	.20	
2-JMS099.30	8/17/1999	M	7.00	30.17		7.32	.20	
2-JMS099.30	8/17/1999	B	9.00	30.15	7.53	7.10	.20	
2-JMS099.30	8/31/1999	S	.30	26.84	7.61	7.13	.00	
2-JMS099.30	9/13/1999	S	.30	25.57	7.63	7.62		
2-JMS099.30	9/21/1999	S	1.00	21.11	7.03	8.60	.00	
2-JMS099.30	9/21/1999	M	3.00	21.04		8.62	.00	
2-JMS099.30	9/21/1999	M	5.00	21.02		8.61	.00	
2-JMS099.30	9/21/1999	M	7.00	21.02		8.61	.00	
2-JMS099.30	9/21/1999	M	9.00	21.02		8.61	.00	
2-JMS099.30	9/21/1999	B	11.00	21.02	7.02	8.61	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	4/24/2000	S	.10					
2-JMS099.30	4/24/2000	M	.50					
2-JMS099.30	4/24/2000	M	1.00					
2-JMS099.30	4/24/2000	B	1.50					
2-JMS099.30	5/1/2000	S	.30	17.49	7.48	9.44	.00	
2-JMS099.30	5/22/2000	S	.30	24.10	7.12	6.00	.00	
2-JMS099.30	5/23/2000	B	7.00	23.20	7.30	5.30	.10	
2-JMS099.30	5/23/2000	S	1.00	23.34	7.29	6.30	.10	
2-JMS099.30	5/23/2000	M	3.00	23.30		6.06	.10	
2-JMS099.30	5/23/2000	M	5.00	23.28		5.60	.10	
2-JMS099.30	5/23/2000	S	.10					
2-JMS099.30	5/23/2000	M	.50					
2-JMS099.30	5/23/2000	M	1.00					
2-JMS099.30	5/23/2000	M	1.50					
2-JMS099.30	5/23/2000	M	2.00					
2-JMS099.30	5/23/2000	B	2.50					
2-JMS099.30	6/5/2000	S	.30	24.32	7.63	7.78	.00	
2-JMS099.30	6/20/2000	B	5.00	28.99	7.39	6.03	.10	
2-JMS099.30	6/20/2000	S	1.00	29.24	7.40	5.87	.10	
2-JMS099.30	6/20/2000	M	3.00	29.08		6.03	.10	
2-JMS099.30	6/22/2000	S	.30					
2-JMS099.30	6/22/2000	S	.30	28.16	7.51	7.10	.00	
2-JMS099.30	7/11/2000	S	.30	30.43	8.26	8.80	.00	
2-JMS099.30	7/18/2000	B	6.00	28.93	7.54	7.69	.10	
2-JMS099.30	7/18/2000	S	1.00	30.02	7.00	9.42	.10	
2-JMS099.30	7/18/2000	M	3.00	29.01		7.81	.10	
2-JMS099.30	7/18/2000	M	5.00	28.88		7.71	.10	
2-JMS099.30	7/18/2000	S	.10					
2-JMS099.30	7/18/2000	M	.50					
2-JMS099.30	7/18/2000	M	1.00					
2-JMS099.30	7/18/2000	M	1.50					
2-JMS099.30	7/18/2000	B	2.00					
2-JMS099.30	7/26/2000	S	.30	26.15	7.32	6.68	.00	
2-JMS099.30	8/7/2000	S	.30	28.64	7.62	7.25	.00	
2-JMS099.30	8/22/2000	B	14.00	26.60	7.58	7.04	.00	
2-JMS099.30	8/22/2000	S	1.00	26.86	7.76	7.54	.00	
2-JMS099.30	8/22/2000	M	3.00	26.70		7.25	.00	
2-JMS099.30	8/22/2000	M	5.00	26.64		7.11	.00	
2-JMS099.30	8/22/2000	M	7.00	26.63		7.11	.00	
2-JMS099.30	8/22/2000	S	.10					
2-JMS099.30	8/22/2000	M	.50					
2-JMS099.30	8/22/2000	M	1.00					
2-JMS099.30	8/22/2000	M	1.50					
2-JMS099.30	8/22/2000	M	2.00					
2-JMS099.30	8/22/2000	M	2.50					
2-JMS099.30	8/22/2000	M	3.00					
2-JMS099.30	8/22/2000	B	3.50					
2-JMS099.30	8/23/2000	S	.30	28.43	8.03	8.41		
2-JMS099.30	9/13/2000	S	.30	25.95	7.51	7.88	.00	
2-JMS099.30	9/26/2000	B	5.00	21.69	7.54	7.53	.10	
2-JMS099.30	9/26/2000	S	1.00	21.66	7.55	7.45	.10	
2-JMS099.30	9/26/2000	M	3.00	21.68		7.66	.10	
2-JMS099.30	9/26/2000	S	.10					
2-JMS099.30	9/26/2000	M	.50					
2-JMS099.30	9/26/2000	M	1.00					
2-JMS099.30	9/26/2000	M	1.50					
2-JMS099.30	9/26/2000	B	2.00					
2-JMS099.30	10/2/2000	S	.30	20.01	7.63	8.47	.00	
2-JMS099.30	10/16/2000	S	.30	17.13	7.75	8.97	.00	
2-JMS099.30	10/24/2000	B	10.00	18.74	7.72	8.14	.00	
2-JMS099.30	10/24/2000	S	1.00	20.05		9.37	.00	
2-JMS099.30	10/24/2000	M	3.00	18.99		8.37	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	10/24/2000	M	5.00	18.84		8.21	.00	
2-JMS099.30	10/24/2000	M	7.00	18.82		8.34	.00	
2-JMS099.30	10/24/2000	M	9.00	18.76		8.25	.00	
2-JMS099.30	10/24/2000	S	.10					
2-JMS099.30	10/24/2000	M	.50					
2-JMS099.30	10/24/2000	M	1.00					
2-JMS099.30	10/24/2000	M	1.50					
2-JMS099.30	10/24/2000	M	2.00					
2-JMS099.30	10/24/2000	B	2.50					
2-JMS099.30	10/30/2000	S	.30	17.50	7.55	8.22	.00	
2-JMS099.30	11/28/2000	S	1.00					
2-JMS099.30	11/28/2000	M	3.00					
2-JMS099.30	11/28/2000	M	5.00					
2-JMS099.30	11/28/2000	M	7.00					
2-JMS099.30	11/28/2000	B	9.00					
2-JMS099.30	11/28/2000	S	.10					
2-JMS099.30	1/23/2001	S	.10					
2-JMS099.30	1/23/2001	M	.50					
2-JMS099.30	1/23/2001	M	1.00					
2-JMS099.30	1/23/2001	S	1.00	3.16	6.98	13.55	.00	
2-JMS099.30	1/23/2001	B	1.50					
2-JMS099.30	1/23/2001	M	3.00	3.11		13.61	.00	
2-JMS099.30	1/23/2001	B	4.00	3.08	7.00	13.78	.00	
2-JMS099.30	2/20/2001	S	.10					
2-JMS099.30	2/20/2001	M	.50					
2-JMS099.30	2/20/2001	S	1.00	8.52	7.49	11.53	.10	
2-JMS099.30	2/20/2001	M	1.00					
2-JMS099.30	2/20/2001	M	1.50					
2-JMS099.30	2/20/2001	M	2.00					
2-JMS099.30	2/20/2001	M	2.50					
2-JMS099.30	2/20/2001	B	3.00					
2-JMS099.30	2/20/2001	M	3.00	8.26		11.53	.10	
2-JMS099.30	2/20/2001	M	5.00	8.11		11.51	.10	
2-JMS099.30	2/20/2001	M	7.00	7.98		11.52	.10	
2-JMS099.30	2/20/2001	M	9.00	7.76		11.43	.10	
2-JMS099.30	2/20/2001	B	10.00	7.96	7.60	11.56	.10	
2-JMS099.30	3/27/2001	S	.10					
2-JMS099.30	3/27/2001	M	.50					
2-JMS099.30	3/27/2001	M	1.00					
2-JMS099.30	3/27/2001	S	1.00	9.31	6.86	12.18	.10	
2-JMS099.30	3/27/2001	M	1.50					
2-JMS099.30	3/27/2001	B	2.00					
2-JMS099.30	3/27/2001	M	3.00	9.28		12.26	.10	
2-JMS099.30	3/27/2001	M	5.00	9.21		12.28	.10	
2-JMS099.30	3/27/2001	M	7.00	9.00		12.36	.10	
2-JMS099.30	3/27/2001	B	8.00	8.98	6.67	12.60	.10	
2-JMS099.30	4/24/2001	S	1.00	19.57	7.97	9.63	.00	
2-JMS099.30	4/24/2001	M	3.00	19.44		9.37	.00	
2-JMS099.30	4/24/2001	M	5.00	19.44		9.33	.00	
2-JMS099.30	4/24/2001	M	7.00	19.42		9.36	.00	
2-JMS099.30	4/24/2001	M	9.00	19.40		9.31	.00	
2-JMS099.30	4/24/2001	B	10.00	19.40	7.90	9.39	.00	
2-JMS099.30	4/24/2001	S	.10					
2-JMS099.30	4/24/2001	M	.50					
2-JMS099.30	4/24/2001	M	1.00					
2-JMS099.30	4/24/2001	M	1.50					
2-JMS099.30	4/24/2001	M	2.00					
2-JMS099.30	4/24/2001	M	2.50					
2-JMS099.30	4/24/2001	B	3.00					
2-JMS099.30	5/7/2001	S	.30	24.21	8.64	10.31		
2-JMS099.30	5/30/2001	S	.30	19.20	7.40	9.10		
2-JMS099.30	6/13/2001	S	.30	28.02	8.43	9.47	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	6/19/2001	S	.10					
2-JMS099.30	6/19/2001	M	.50					
2-JMS099.30	6/19/2001	S	1.00	28.43	8.28	9.14	.10	
2-JMS099.30	6/19/2001	M	1.00					
2-JMS099.30	6/19/2001	M	1.50					
2-JMS099.30	6/19/2001	M	2.00					
2-JMS099.30	6/19/2001	M	2.50					
2-JMS099.30	6/19/2001	M	3.00	27.82		8.06	.10	
2-JMS099.30	6/19/2001	B	3.50					
2-JMS099.30	6/19/2001	M	5.00	27.57		7.83	.10	
2-JMS099.30	6/19/2001	M	7.00	27.49		7.66	.10	
2-JMS099.30	6/19/2001	B	8.00	27.49	7.67	7.66	.10	
2-JMS099.30	6/28/2001	S	.30	29.79	7.50	7.84		
2-JMS099.30	7/5/2001	S	.30	28.96	6.82	5.38		
2-JMS099.30	7/24/2001	S	.10					
2-JMS099.30	7/24/2001	M	.50					
2-JMS099.30	7/24/2001	S	1.00	28.29	7.33	7.34	.00	
2-JMS099.30	7/24/2001	M	1.00					
2-JMS099.30	7/24/2001	M	1.50					
2-JMS099.30	7/24/2001	M	2.00					
2-JMS099.30	7/24/2001	M	2.50					
2-JMS099.30	7/24/2001	M	3.00	28.03	7.27	7.06	.00	
2-JMS099.30	7/24/2001	M	3.50					
2-JMS099.30	7/24/2001	B	4.00					
2-JMS099.30	7/24/2001	M	5.00	27.84	7.29	6.68	.00	
2-JMS099.30	7/24/2001	M	7.00	27.73	7.23	6.94	.00	
2-JMS099.30	7/24/2001	B	8.00	27.61	7.19	6.85	.00	
2-JMS099.30	7/30/2001	S	.30	26.80	7.17	6.06		
2-JMS099.30	8/6/2001	S	.30	28.46	7.94	7.52		
2-JMS099.30	8/21/2001	S	.10					
2-JMS099.30	8/21/2001	M	.50					
2-JMS099.30	8/21/2001	S	1.00	27.65	7.49	6.64	.00	
2-JMS099.30	8/21/2001	M	1.00					
2-JMS099.30	8/21/2001	M	1.50					
2-JMS099.30	8/21/2001	B	2.00					
2-JMS099.30	8/21/2001	M	3.00	29.54		6.83	.00	
2-JMS099.30	8/21/2001	M	5.00	29.53		6.66	.00	
2-JMS099.30	8/21/2001	M	7.00	29.51		6.59	.00	
2-JMS099.30	8/21/2001	M	9.00	29.46		6.50	.00	
2-JMS099.30	8/21/2001	B	10.00	29.43	7.47	6.42	.00	
2-JMS099.30	8/23/2001	S	.30	29.21	7.36	6.15		
2-JMS099.30	9/18/2001	S	.10					
2-JMS099.30	9/18/2001	M	.50					
2-JMS099.30	9/18/2001	M	1.00					
2-JMS099.30	9/18/2001	S	1.00	27.25	8.10	8.02	.30	
2-JMS099.30	9/18/2001	M	1.50					
2-JMS099.30	9/18/2001	M	2.00					
2-JMS099.30	9/18/2001	M	3.00	26.40		7.35	.30	
2-JMS099.30	9/18/2001	M	5.00	26.04		8.03	.20	
2-JMS099.30	9/18/2001	M	7.00	25.72		7.89	.20	
2-JMS099.30	9/18/2001	M	9.00	25.61		7.32	.20	
2-JMS099.30	9/18/2001	B	10.00	25.51	7.88	7.52	.20	
2-JMS099.30	10/16/2001	S	.00					
2-JMS099.30	10/16/2001	S	.10					
2-JMS099.30	10/16/2001	M	.50					
2-JMS099.30	10/16/2001	M	1.00					
2-JMS099.30	10/16/2001	S	1.00	22.64	8.16	9.43	.30	
2-JMS099.30	10/16/2001	M	1.50					
2-JMS099.30	10/16/2001	M	2.00					
2-JMS099.30	10/16/2001	M	2.50					
2-JMS099.30	10/16/2001	M	3.00	22.01		8.92	.30	
2-JMS099.30	10/16/2001	M	5.00	21.62		8.63	.30	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	10/16/2001	M	7.00	21.32		8.61	.30	
2-JMS099.30	10/16/2001	M	9.00	21.25		8.57	.30	
2-JMS099.30	10/16/2001	M	11.00	21.18		8.55	.30	
2-JMS099.30	10/16/2001	B	12.00	21.18	7.89	8.58	.30	
2-JMS099.30	11/27/2001	S	.10					
2-JMS099.30	11/27/2001	M	.50					
2-JMS099.30	11/27/2001	B	1.00					
2-JMS099.30	11/27/2001	S	1.00	15.22	7.67	8.96	.00	
2-JMS099.30	11/27/2001	M	3.00	14.24		8.84	.00	
2-JMS099.30	11/27/2001	M	5.00	14.03		9.00	.00	
2-JMS099.30	11/27/2001	M	7.00	13.55		9.12	.00	
2-JMS099.30	11/27/2001	M	9.00	13.46		9.30	.00	
2-JMS099.30	11/27/2001	B	10.00	13.44	7.65	9.40	.00	
2-JMS099.30	12/12/2001	S	.10					
2-JMS099.30	12/12/2001	M	.50					
2-JMS099.30	12/12/2001	B	1.00					
2-JMS099.30	12/12/2001	S	1.00	15.30	7.43	8.40	.00	
2-JMS099.30	12/12/2001	M	3.00	13.68		8.60	.00	
2-JMS099.30	12/12/2001	M	5.00	13.41		8.78	.00	
2-JMS099.30	12/12/2001	M	7.00	13.51		8.93	.20	
2-JMS099.30	12/12/2001	B	9.00	13.38	7.34	9.23	.20	
2-JMS099.30	1/22/2002	S	.10					
2-JMS099.30	1/22/2002	M	.50					
2-JMS099.30	1/22/2002	S	1.00	6.11	7.54	11.98	.00	
2-JMS099.30	1/22/2002	M	1.00					
2-JMS099.30	1/22/2002	M	1.50					
2-JMS099.30	1/22/2002	M	2.00					
2-JMS099.30	1/22/2002	M	2.50					
2-JMS099.30	1/22/2002	M	3.00	6.14		12.02	.00	
2-JMS099.30	1/22/2002	B	3.50					
2-JMS099.30	1/22/2002	M	5.00	6.06		12.04	.00	
2-JMS099.30	1/22/2002	M	7.00	6.05		12.09	.00	
2-JMS099.30	1/22/2002	M	9.00	5.98		12.30	.00	
2-JMS099.30	1/22/2002	B	11.00	6.01	7.14	12.90	.00	
2-JMS099.30	2/19/2002	S	.10					
2-JMS099.30	2/19/2002	M	.50					
2-JMS099.30	2/19/2002	S	1.00	8.05	7.61	11.05	.14	
2-JMS099.30	2/19/2002	M	1.00					
2-JMS099.30	2/19/2002	M	1.50					
2-JMS099.30	2/19/2002	M	2.00					
2-JMS099.30	2/19/2002	M	2.50					
2-JMS099.30	2/19/2002	M	3.00	7.64		11.06	.13	
2-JMS099.30	2/19/2002	M	3.50					
2-JMS099.30	2/19/2002	B	4.00					
2-JMS099.30	2/19/2002	M	5.00	7.66		11.28	.13	
2-JMS099.30	2/19/2002	M	7.00	7.68		11.17	.14	
2-JMS099.30	2/19/2002	M	9.00	7.68		11.09	.14	
2-JMS099.30	2/19/2002	M	11.00	7.69		11.19	.14	
2-JMS099.30	2/19/2002	B	12.00	7.68	7.51	11.28	.13	
2-JMS099.30	3/19/2002	S	.10					
2-JMS099.30	3/19/2002	M	.50					
2-JMS099.30	3/19/2002	B	1.00					
2-JMS099.30	3/19/2002	S	1.00	13.40	7.54	8.27	.15	
2-JMS099.30	3/19/2002	M	3.00	13.39		8.48	.15	
2-JMS099.30	3/19/2002	M	5.00	13.34		8.28	.15	
2-JMS099.30	3/19/2002	M	7.00	13.29		8.30	.15	
2-JMS099.30	3/19/2002	M	9.00	13.28		8.27	.15	
2-JMS099.30	3/19/2002	M	11.00	13.27		8.36	.15	
2-JMS099.30	3/19/2002	B	12.00	13.26	7.50	8.19	.15	
2-JMS099.30	4/16/2002	S	.10					
2-JMS099.30	4/16/2002	M	.50					
2-JMS099.30	4/16/2002	S	1.00	21.70	7.40	7.91	.80	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	4/16/2002	M	1.00					
2-JMS099.30	4/16/2002	M	1.50					
2-JMS099.30	4/16/2002	M	2.00					
2-JMS099.30	4/16/2002	M	2.50					
2-JMS099.30	4/16/2002	M	3.00	21.21		7.79	.80	
2-JMS099.30	4/16/2002	M	3.50					
2-JMS099.30	4/16/2002	M	4.00					
2-JMS099.30	4/16/2002	B	4.50					
2-JMS099.30	4/16/2002	M	5.00	21.05		7.81	.80	
2-JMS099.30	4/16/2002	M	7.00	20.86		7.79	.80	
2-JMS099.30	4/16/2002	B	8.00	20.78	7.35	7.68	.80	
2-JMS099.30	5/30/2002	S	.10					
2-JMS099.30	5/30/2002	M	.50					
2-JMS099.30	5/30/2002	M	1.00					
2-JMS099.30	5/30/2002	S	1.00	26.41	8.19	8.12	.00	
2-JMS099.30	5/30/2002	M	1.50					
2-JMS099.30	5/30/2002	M	2.00					
2-JMS099.30	5/30/2002	B	2.50					
2-JMS099.30	5/30/2002	M	3.00	26.01	7.99	7.67	.00	
2-JMS099.30	5/30/2002	M	5.00	25.44	7.74	7.25	.00	
2-JMS099.30	5/30/2002	M	7.00	25.31	7.60	6.54	.00	
2-JMS099.30	5/30/2002	M	9.00	25.32	7.52	6.53	.00	
2-JMS099.30	5/30/2002	B	10.00	25.31	7.48	6.43	.00	
2-JMS099.30	6/25/2002	S	.10					
2-JMS099.30	6/25/2002	M	.50					
2-JMS099.30	6/25/2002	M	1.00					
2-JMS099.30	6/25/2002	S	1.00	31.26	8.19		.00	
2-JMS099.30	6/25/2002	M	1.50					
2-JMS099.30	6/25/2002	B	2.00					
2-JMS099.30	6/25/2002	M	3.00	30.54	7.94		.00	
2-JMS099.30	6/25/2002	M	5.00	30.51	7.94		.00	
2-JMS099.30	6/25/2002	M	7.00	30.33	7.89		.00	
2-JMS099.30	6/25/2002	M	9.00	29.94	7.81		.00	
2-JMS099.30	6/25/2002	B	10.00	29.94	7.73		.00	
2-JMS099.30	7/23/2002	S	.10					
2-JMS099.30	7/23/2002	M	.50					
2-JMS099.30	7/23/2002	S	1.00	32.08	7.86	7.89	.00	
2-JMS099.30	7/23/2002	M	1.00					
2-JMS099.30	7/23/2002	M	1.50					
2-JMS099.30	7/23/2002	M	2.00					
2-JMS099.30	7/23/2002	M	2.50					
2-JMS099.30	7/23/2002	M	3.00	31.05	7.64	6.80	.00	
2-JMS099.30	7/23/2002	B	3.00					
2-JMS099.30	7/23/2002	M	5.00	30.94	7.62	6.77	.00	
2-JMS099.30	7/23/2002	M	7.00	30.70	7.56	6.68	.00	
2-JMS099.30	7/23/2002	M	9.00	30.68	7.59	6.69	.00	
2-JMS099.30	7/23/2002	M	11.00	30.74	7.58	4.35	.00	
2-JMS099.30	7/23/2002	B	12.00	30.60	7.20	4.35	.00	
2-JMS099.30	8/13/2002	S	.10					
2-JMS099.30	8/13/2002	M	.50					
2-JMS099.30	8/13/2002	S	1.00	30.51	7.92	7.55	.00	
2-JMS099.30	8/13/2002	M	1.00					
2-JMS099.30	8/13/2002	M	1.50					
2-JMS099.30	8/13/2002	M	2.00					
2-JMS099.30	8/13/2002	M	2.50					
2-JMS099.30	8/13/2002	M	3.00	30.11	7.81	7.14	.00	
2-JMS099.30	8/13/2002	B	3.50					
2-JMS099.30	8/13/2002	M	5.00	29.67	7.68	6.73	.00	
2-JMS099.30	8/13/2002	M	7.00	29.64	7.69	6.76	.00	
2-JMS099.30	8/13/2002	M	9.00	29.62	7.68	6.85	.00	
2-JMS099.30	8/13/2002	B	11.00	29.64	7.69	6.86	.00	
2-JMS099.30	9/24/2002	S	.10					

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	9/24/2002	M	.50					
2-JMS099.30	9/24/2002	S	1.00	28.76	7.85	7.76	.00	
2-JMS099.30	9/24/2002	M	1.00					
2-JMS099.30	9/24/2002	M	1.50					
2-JMS099.30	9/24/2002	B	2.00					
2-JMS099.30	9/24/2002	M	3.00	28.19	7.45	6.34	.00	
2-JMS099.30	9/24/2002	M	5.00	28.06	7.38	6.26	.00	
2-JMS099.30	9/24/2002	M	7.00	27.92	7.37	6.36	.00	
2-JMS099.30	9/24/2002	B	9.00	27.75	7.37	6.61	.00	
2-JMS099.30	10/22/2002	S	.10					
2-JMS099.30	10/22/2002	M	.50					
2-JMS099.30	10/22/2002	M	1.00					
2-JMS099.30	10/22/2002	M	1.50					
2-JMS099.30	10/22/2002	M	2.00					
2-JMS099.30	10/22/2002	M	2.50					
2-JMS099.30	10/22/2002	M	3.00					
2-JMS099.30	10/22/2002	B	3.50					
2-JMS099.30	10/22/2002	S	1.00	17.65	7.80	7.65	.00	
2-JMS099.30	10/22/2002	M	3.00	17.68	7.77	7.68	.00	
2-JMS099.30	10/22/2002	M	5.00	17.33	7.78	7.50	.00	
2-JMS099.30	10/22/2002	M	7.00	17.39	7.79	7.31	.00	
2-JMS099.30	10/22/2002	M	9.00	17.34	7.80	7.44	.00	
2-JMS099.30	10/22/2002	B	10.00	17.30	7.80	7.61	.00	
2-JMS099.30	11/19/2002	S	.10					
2-JMS099.30	11/19/2002	M	.50					
2-JMS099.30	11/19/2002	S	1.00	10.01	7.05	12.35	.00	
2-JMS099.30	11/19/2002	B	1.00					
2-JMS099.30	11/19/2002	M	3.00	10.01	7.06	11.65	.00	
2-JMS099.30	11/19/2002	M	5.00	10.01	7.05	12.32	.00	
2-JMS099.30	11/19/2002	M	7.00	10.01	7.05	13.17	.00	
2-JMS099.30	11/19/2002	M	9.00	10.03	7.05	11.83	.00	
2-JMS099.30	11/19/2002	B	10.00	10.03	7.05	12.04	.00	
2-JMS099.30	12/10/2002	S	.10					
2-JMS099.30	12/10/2002	M	.50					
2-JMS099.30	12/10/2002	M	1.00					
2-JMS099.30	12/10/2002	S	1.00	2.53	7.46	14.38	.00	
2-JMS099.30	12/10/2002	M	1.50					
2-JMS099.30	12/10/2002	B	2.00					
2-JMS099.30	12/10/2002	M	3.00	2.53	7.46	15.45	.00	
2-JMS099.30	12/10/2002	M	5.00	2.52	7.45	14.58	.00	
2-JMS099.30	12/10/2002	M	7.00	2.53	7.46	15.41	.00	
2-JMS099.30	12/10/2002	B	9.00	2.54	7.46	14.97	.00	
2-JMS099.30	1/21/2003	S	.10					
2-JMS099.30	1/21/2003	M	.50					
2-JMS099.30	1/21/2003	M	1.00					
2-JMS099.30	1/21/2003	S	1.00	1.48	7.68	15.03	.00	
2-JMS099.30	1/21/2003	M	1.50					
2-JMS099.30	1/21/2003	M	2.00					
2-JMS099.30	1/21/2003	B	2.50					
2-JMS099.30	1/21/2003	M	3.00	1.48	7.55	15.18	.00	
2-JMS099.30	1/21/2003	M	5.00	1.49	7.60	14.98	.00	
2-JMS099.30	1/21/2003	M	7.00	1.49	7.56	15.37	.00	
2-JMS099.30	1/21/2003	B	9.00	1.49	7.54	15.14	.00	
2-JMS099.30	2/25/2003	S	.10					
2-JMS099.30	2/25/2003	S	1.00	4.46	6.80	12.90	.00	
2-JMS099.30	2/25/2003	M	2.00	4.46	6.81	12.79	.00	
2-JMS099.30	2/25/2003	M	3.00	4.46	6.72	12.79	.00	
2-JMS099.30	2/25/2003	M	4.00	4.46	6.96	12.69	.00	
2-JMS099.30	2/25/2003	B	5.00	4.46	6.85	12.67	.00	
2-JMS099.30	3/18/2003	S	.10					
2-JMS099.30	3/18/2003	M	.50					
2-JMS099.30	3/18/2003	S	1.00	11.73	7.80	10.35	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	3/18/2003	M	1.00					
2-JMS099.30	3/18/2003	M	1.50					
2-JMS099.30	3/18/2003	M	2.00					
2-JMS099.30	3/18/2003	M	3.00	11.47	7.77	10.80	.00	
2-JMS099.30	3/18/2003	M	5.00	11.27	7.75	10.63	.00	
2-JMS099.30	3/18/2003	M	7.00	11.45	7.75	10.85	.00	
2-JMS099.30	3/18/2003	M	9.00	11.31	7.74	10.95	.00	
2-JMS099.30	3/18/2003	M	11.00	11.23	7.74	10.96	.00	
2-JMS099.30	3/18/2003	B	12.00	11.20	7.74	10.98	.00	
2-JMS099.30	4/15/2003	S	1.00	13.31	6.86	11.27	.00	
2-JMS099.30	4/15/2003	B	3.00	13.40	7.35	11.23	.00	
2-JMS099.30	5/27/2003	S	.10					
2-JMS099.30	5/27/2003	S	1.00	17.21	6.90	9.37	.00	
2-JMS099.30	5/27/2003	M	3.00	17.32	6.85	9.36	.00	
2-JMS099.30	5/27/2003	M	5.00	17.22	6.94	9.00	.00	
2-JMS099.30	5/27/2003	B	6.00	17.22	6.96	9.04	.00	
2-JMS099.30	6/24/2003	S	.10					
2-JMS099.30	6/24/2003	M	.50					
2-JMS099.30	6/24/2003	S	1.00	21.07	7.59	8.35	.00	
2-JMS099.30	6/24/2003	M	1.00					
2-JMS099.30	6/24/2003	M	1.50					
2-JMS099.30	6/24/2003	M	2.00					
2-JMS099.30	6/24/2003	M	3.00	21.04	7.58	8.36	.00	
2-JMS099.30	6/24/2003	M	5.00	21.03	7.58	8.37	.00	
2-JMS099.30	6/24/2003	M	7.00	21.07	7.57	8.43	.00	
2-JMS099.30	6/24/2003	M	9.00	21.06	7.57	8.55	.00	
2-JMS099.30	6/24/2003	M	11.00	21.07	7.58	8.67	.00	
2-JMS099.30	6/24/2003	B	12.00	21.06	7.58	8.66	.00	
2-JMS099.30	7/15/2003	S	.10					
2-JMS099.30	7/15/2003	M	.50					
2-JMS099.30	7/15/2003	S	1.00	27.76	8.25	8.89	.00	
2-JMS099.30	7/15/2003	M	1.00					
2-JMS099.30	7/15/2003	M	1.50					
2-JMS099.30	7/15/2003	M	2.00					
2-JMS099.30	7/15/2003	M	2.50					
2-JMS099.30	7/15/2003	M	3.00	27.18	7.81	7.91	.00	
2-JMS099.30	7/15/2003	M	5.00	27.07	7.72	7.77	.00	
2-JMS099.30	7/15/2003	B	7.00	26.95	7.67	7.71	.00	
2-JMS099.30	8/26/2003	S	.10					
2-JMS099.30	8/26/2003	M	.50					
2-JMS099.30	8/26/2003	S	1.00	29.41	8.19	8.41	.00	
2-JMS099.30	8/26/2003	M	1.00					
2-JMS099.30	8/26/2003	M	1.50					
2-JMS099.30	8/26/2003	M	2.00					
2-JMS099.30	8/26/2003	M	2.50					
2-JMS099.30	8/26/2003	M	3.00	28.45	7.99	7.82	.00	
2-JMS099.30	8/26/2003	B	3.00					
2-JMS099.30	8/26/2003	M	5.00	28.10	7.83	7.48	.00	
2-JMS099.30	8/26/2003	M	7.00	28.00	7.78	7.33	.00	
2-JMS099.30	8/26/2003	M	9.00	27.97	7.78	7.24	.00	
2-JMS099.30	8/26/2003	M	11.00	27.95	7.77	7.15	.00	
2-JMS099.30	8/26/2003	B	12.00	27.95	7.77	7.20	.00	
2-JMS099.30	9/24/2003	S	.10					
2-JMS099.30	9/24/2003	S	1.00	21.04	7.20	8.81	.00	
2-JMS099.30	9/24/2003	B	3.00	21.01	7.31	8.69	.00	
2-JMS099.30	10/28/2003	S	.10					
2-JMS099.30	10/28/2003	B	.50					
2-JMS099.30	10/28/2003	S	1.00	15.22	7.71	9.56	.00	
2-JMS099.30	10/28/2003	M	3.00	15.22	7.71	9.56	.00	
2-JMS099.30	10/28/2003	M	5.00	15.23	7.70	9.47	.00	
2-JMS099.30	10/28/2003	M	7.00	15.23	7.70	9.55	.00	
2-JMS099.30	10/28/2003	B	9.00	15.19	7.69	9.78	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	11/18/2003	S	.10					
2-JMS099.30	11/18/2003	M	.50					
2-JMS099.30	11/18/2003	S	1.00	10.40	7.57	10.34	.00	
2-JMS099.30	11/18/2003	M	1.00					
2-JMS099.30	11/18/2003	B	1.50					
2-JMS099.30	11/18/2003	M	3.00	10.40	7.53	10.58	.00	
2-JMS099.30	11/18/2003	M	5.00	10.39	7.51	10.55	.00	
2-JMS099.30	11/18/2003	M	7.00	10.38	7.49	10.44	.00	
2-JMS099.30	11/18/2003	M	9.00	10.36	7.50	10.31	.00	
2-JMS099.30	11/18/2003	M	11.00	10.40	7.50	10.31	.00	
2-JMS099.30	11/18/2003	B	12.00	10.41	7.50	10.37	.00	
2-JMS099.30	12/16/2003	S	.10					
2-JMS099.30	12/16/2003	M	.50					
2-JMS099.30	12/16/2003	M	1.00					
2-JMS099.30	12/16/2003	S	1.00	4.23	7.26	12.72	.00	
2-JMS099.30	12/16/2003	M	3.00	4.21	7.24	12.50	.00	
2-JMS099.30	12/16/2003	M	5.00	4.21	7.22	12.58	.00	
2-JMS099.30	12/16/2003	M	7.00	4.22	7.20	12.70	.00	
2-JMS099.30	12/16/2003	M	9.00	4.24	7.21	12.55	.00	
2-JMS099.30	12/16/2003	B	10.00	4.26	7.21	12.66	.00	
2-JMS099.30	2/25/2004	S	.10					
2-JMS099.30	2/25/2004	M	.50					
2-JMS099.30	2/25/2004	S	1.00	6.37	7.67	12.32	.00	
2-JMS099.30	2/25/2004	M	1.00					
2-JMS099.30	2/25/2004	M	1.50					
2-JMS099.30	2/25/2004	M	2.00					
2-JMS099.30	2/25/2004	M	2.50					
2-JMS099.30	2/25/2004	M	3.00	6.36	7.67	12.33	.00	
2-JMS099.30	2/25/2004	M	3.50					
2-JMS099.30	2/25/2004	M	4.00					
2-JMS099.30	2/25/2004	M	4.50					
2-JMS099.30	2/25/2004	M	5.00	6.36	7.64	12.33	.00	
2-JMS099.30	2/25/2004	M	7.00	6.37	7.65	12.35	.00	
2-JMS099.30	2/25/2004	B	9.00	6.39	7.64	12.41	.00	
2-JMS099.30	3/23/2004	S	.10					
2-JMS099.30	3/23/2004	M	.50					
2-JMS099.30	3/23/2004	S	1.00	11.69	8.29	10.84	.00	
2-JMS099.30	3/23/2004	M	1.00					
2-JMS099.30	3/23/2004	M	1.50					
2-JMS099.30	3/23/2004	M	2.00					
2-JMS099.30	3/23/2004	M	2.50					
2-JMS099.30	3/23/2004	M	3.00	11.55	8.26	10.93	.00	
2-JMS099.30	3/23/2004	M	3.50					
2-JMS099.30	3/23/2004	M	4.00					
2-JMS099.30	3/23/2004	M	5.00	11.70	8.27	10.81	.00	
2-JMS099.30	3/23/2004	M	7.00	11.66	8.27	10.95	.00	
2-JMS099.30	3/23/2004	B	8.00	11.64	8.25	11.17	.00	
2-JMS099.30	4/20/2004	S	.10					
2-JMS099.30	4/20/2004	M	.50					
2-JMS099.30	4/20/2004	M	1.00					
2-JMS099.30	4/20/2004	S	1.00	17.16	7.32	9.41	.00	
2-JMS099.30	4/20/2004	M	1.50					
2-JMS099.30	4/20/2004	B	2.00					
2-JMS099.30	4/20/2004	M	3.00	16.91	7.32	9.39	.00	
2-JMS099.30	4/20/2004	M	5.00	16.85	7.32	9.49	.00	
2-JMS099.30	4/20/2004	B	7.00	16.83	7.33	9.52	.00	
2-JMS099.30	5/18/2004	S	.10					
2-JMS099.30	5/18/2004	M	.50					
2-JMS099.30	5/18/2004	S	1.00		7.43			
2-JMS099.30	5/18/2004	M	1.00					
2-JMS099.30	5/18/2004	M	1.50					
2-JMS099.30	5/18/2004	M	2.00					

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	5/18/2004	M	2.50					
2-JMS099.30	5/18/2004	M	3.00		7.45			
2-JMS099.30	5/18/2004	M	3.50					
2-JMS099.30	5/18/2004	M	5.00		7.39			
2-JMS099.30	5/18/2004	M	7.00		7.38			
2-JMS099.30	5/18/2004	M	9.00		7.32			
2-JMS099.30	5/18/2004	B	11.00		7.30			
2-JMS099.30	6/15/2004	S	.10					
2-JMS099.30	6/15/2004	M	.50					
2-JMS099.30	6/15/2004	S	1.00	26.02	7.37	7.75	.00	
2-JMS099.30	6/15/2004	M	1.00					
2-JMS099.30	6/15/2004	M	1.50					
2-JMS099.30	6/15/2004	M	2.00					
2-JMS099.30	6/15/2004	M	2.50					
2-JMS099.30	6/15/2004	M	3.00	24.96	7.37	7.59	.00	
2-JMS099.30	6/15/2004	M	5.00	24.90	7.33	7.51	.00	
2-JMS099.30	6/15/2004	M	7.00	24.79	7.33	7.47	.00	
2-JMS099.30	6/15/2004	M	9.00	24.69	7.34	7.40	.00	
2-JMS099.30	6/15/2004	B	11.00	24.65	7.34	7.32	.00	
2-JMS099.30	7/20/2004	S	.10					
2-JMS099.30	7/20/2004	M	.50					
2-JMS099.30	7/20/2004	M	1.00					
2-JMS099.30	7/20/2004	S	1.00	28.35	7.78	7.20	.00	
2-JMS099.30	7/20/2004	M	1.50					
2-JMS099.30	7/20/2004	M	2.00					
2-JMS099.30	7/20/2004	M	3.00	27.70	7.67	6.80	.00	
2-JMS099.30	7/20/2004	M	5.00	27.63	7.67	6.49	.00	
2-JMS099.30	7/20/2004	M	7.00	27.60	7.68	6.78	.00	
2-JMS099.30	7/20/2004	M	9.00	27.57	7.66	6.64	.00	
2-JMS099.30	7/20/2004	B	11.00	27.58	7.65	6.45	.00	
2-JMS099.30	8/17/2004	S	1.00	22.91	7.14	6.97	.00	
2-JMS099.30	8/17/2004	M	3.00	22.92	7.12	6.93	.00	
2-JMS099.30	8/17/2004	M	5.00	22.89	7.12	7.23	.00	
2-JMS099.30	8/17/2004	B	6.00	22.90	7.13	7.20	.00	
2-JMS099.30	9/21/2004	S	.10					
2-JMS099.30	9/21/2004	M	.50					
2-JMS099.30	9/21/2004	S	1.00	20.53	7.56	8.55	.00	
2-JMS099.30	9/21/2004	M	1.00					
2-JMS099.30	9/21/2004	B	1.50					
2-JMS099.30	9/21/2004	M	3.00	20.52	7.55	8.54	.00	
2-JMS099.30	9/21/2004	M	5.00	20.52	7.55	8.51	.00	
2-JMS099.30	9/21/2004	M	7.00	20.48	7.56	8.63	.00	
2-JMS099.30	9/21/2004	M	9.00	20.47	7.55	8.57	.00	
2-JMS099.30	9/21/2004	M	11.00	20.46	7.64	8.65	.00	
2-JMS099.30	9/21/2004	B	12.00	20.47	7.63	8.64	.00	
2-JMS099.30	10/19/2004	S	.10					
2-JMS099.30	10/19/2004	M	.50					
2-JMS099.30	10/19/2004	M	1.00					
2-JMS099.30	10/19/2004	S	1.00	15.56	7.75	9.07	.00	
2-JMS099.30	10/19/2004	M	1.50					
2-JMS099.30	10/19/2004	M	2.00					
2-JMS099.30	10/19/2004	M	3.00	15.56	7.75	9.12	.00	
2-JMS099.30	10/19/2004	M	5.00	15.54	7.71	9.26	.00	
2-JMS099.30	10/19/2004	M	7.00	15.48	7.68	9.35	.00	
2-JMS099.30	10/19/2004	B	9.00	15.42	7.69	9.56	.00	
2-JMS099.30	11/16/2004	S	1.00	9.19	7.47	11.32	.00	
2-JMS099.30	11/16/2004	M	3.00	9.17	7.49	11.32	.00	
2-JMS099.30	11/16/2004	M	5.00	9.19	7.49	11.33	.00	
2-JMS099.30	11/16/2004	M	7.00	9.16	7.48	11.35	.00	
2-JMS099.30	11/16/2004	M	9.00	9.12	7.39	11.43	.00	
2-JMS099.30	11/16/2004	M	11.00	9.13	7.38	11.42	.00	
2-JMS099.30	11/16/2004	B	12.00	9.14	7.44	11.49	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	12/14/2004	S	.10					
2-JMS099.30	12/14/2004	M	.50					
2-JMS099.30	12/14/2004	S	1.00	8.29	7.74	11.33	.00	
2-JMS099.30	12/14/2004	B	1.00					
2-JMS099.30	12/14/2004	M	3.00	8.29	7.72	11.36	.00	
2-JMS099.30	12/14/2004	M	5.00	8.28	7.73	11.27	.00	
2-JMS099.30	12/14/2004	M	7.00	8.28	7.71	11.30	.00	
2-JMS099.30	12/14/2004	B	8.00	8.29	7.73	11.51	.00	
2-JMS099.30	1/26/2005	S	1.00	1.26	7.66	13.83	.00	
2-JMS099.30	1/26/2005	M	3.00	1.27	7.66	13.81	.00	
2-JMS099.30	1/26/2005	M	5.00	1.27	7.65	13.75	.00	
2-JMS099.30	1/26/2005	M	7.00	1.31	7.63	13.90	.00	
2-JMS099.30	1/26/2005	M	9.00	1.31	7.63	13.93	.00	
2-JMS099.30	1/26/2005	M	11.00	1.35	7.66	13.96	.00	
2-JMS099.30	1/26/2005	B	12.00	1.33	7.70	14.13	.00	
2-JMS099.30	2/15/2005	S	.10					
2-JMS099.30	2/15/2005	M	.50					
2-JMS099.30	2/15/2005	S	1.00	7.23	7.81	11.88	.00	
2-JMS099.30	2/15/2005	M	1.00					
2-JMS099.30	2/15/2005	M	1.50					
2-JMS099.30	2/15/2005	M	2.00					
2-JMS099.30	2/15/2005	M	2.50					
2-JMS099.30	2/15/2005	M	3.00	7.20	7.75	11.89	.00	
2-JMS099.30	2/15/2005	M	3.50					
2-JMS099.30	2/15/2005	M	4.00					
2-JMS099.30	2/15/2005	M	5.00	7.10	7.78	11.85	.00	
2-JMS099.30	2/15/2005	M	7.00	7.17	7.80	11.87	.00	
2-JMS099.30	2/15/2005	M	9.00	7.17	7.76	11.91	.00	
2-JMS099.30	2/15/2005	B	11.00	7.13	7.80	12.03	.00	
2-JMS099.30	3/22/2005	S	.10					
2-JMS099.30	3/22/2005	M	.50					
2-JMS099.30	3/22/2005	M	1.00					
2-JMS099.30	3/22/2005	S	1.00	11.92	8.57	11.29	.00	
2-JMS099.30	3/22/2005	M	1.50					
2-JMS099.30	3/22/2005	M	2.00					
2-JMS099.30	3/22/2005	M	2.50					
2-JMS099.30	3/22/2005	M	3.00	11.50	8.50	11.26	.00	
2-JMS099.30	3/22/2005	M	3.50					
2-JMS099.30	3/22/2005	M	4.00					
2-JMS099.30	3/22/2005	B	4.50					
2-JMS099.30	3/22/2005	M	5.00	11.22	8.55	11.47	.00	
2-JMS099.30	3/22/2005	M	7.00	11.16	8.50	11.41	.00	
2-JMS099.30	3/22/2005	M	9.00	11.15	8.51	11.52	.00	
2-JMS099.30	3/22/2005	B	11.00	11.12	8.54	11.78	.00	
2-JMS099.30	4/19/2005	S	.10					
2-JMS099.30	4/19/2005	M	.50					
2-JMS099.30	4/19/2005	S	1.00	17.80	8.09	9.41	.00	
2-JMS099.30	4/19/2005	M	1.00					
2-JMS099.30	4/19/2005	M	1.50					
2-JMS099.30	4/19/2005	M	2.00					
2-JMS099.30	4/19/2005	B	2.50					
2-JMS099.30	4/19/2005	M	3.00	17.40	8.00	9.60	.00	
2-JMS099.30	4/19/2005	M	5.00	17.20	7.94	9.60	.00	
2-JMS099.30	4/19/2005	M	7.00	17.00	7.92	9.60	.00	
2-JMS099.30	4/19/2005	M	9.00	16.80	7.85	9.79	.00	
2-JMS099.30	4/19/2005	M	11.00	16.10	7.82	9.87	.00	
2-JMS099.30	4/19/2005	B	12.00	16.10	7.84	9.95	.00	
2-JMS099.30	5/24/2005	S	.10					
2-JMS099.30	5/24/2005	M	.50					
2-JMS099.30	5/24/2005	M	1.00					
2-JMS099.30	5/24/2005	S	1.00	21.01	7.22	7.51		
2-JMS099.30	5/24/2005	M	3.00	21.06	7.47	7.71	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	5/24/2005	M	5.00	21.02	7.45	7.69	.00	
2-JMS099.30	5/24/2005	M	7.00	21.00	7.43	7.76		
2-JMS099.30	5/24/2005	M	9.00	20.97	7.41	7.75	.00	
2-JMS099.30	5/24/2005	B	11.00	20.97	7.51	7.75	.00	
2-JMS099.30	6/21/2005	S	.10					
2-JMS099.30	6/21/2005	M	.50					
2-JMS099.30	6/21/2005	S	1.00	27.60	7.68	6.77	.00	
2-JMS099.30	6/21/2005	M	1.00					
2-JMS099.30	6/21/2005	M	1.50					
2-JMS099.30	6/21/2005	M	2.00					
2-JMS099.30	6/21/2005	M	3.00	27.40	7.62	6.48	.00	
2-JMS099.30	6/21/2005	M	5.00	27.20	7.58	6.33	.00	
2-JMS099.30	6/21/2005	M	7.00	27.20	7.57	6.31	.00	
2-JMS099.30	6/21/2005	M	9.00	27.20	7.54	6.29	.00	
2-JMS099.30	6/21/2005	B	10.00	27.10	7.52	6.32	.00	
2-JMS099.30	7/19/2005	S	.10					
2-JMS099.30	7/19/2005	S	.30					
2-JMS099.30	7/19/2005	M	.50					
2-JMS099.30	7/19/2005	M	1.00					
2-JMS099.30	7/19/2005	S	1.00	31.19	7.68	6.97	.00	
2-JMS099.30	7/19/2005	M	1.50					
2-JMS099.30	7/19/2005	M	2.00					
2-JMS099.30	7/19/2005	M	2.50					
2-JMS099.30	7/19/2005	M	3.00	30.74	7.62	6.69	.00	
2-JMS099.30	7/19/2005	M	3.50					
2-JMS099.30	7/19/2005	B	4.00					
2-JMS099.30	7/19/2005	M	5.00	30.66	7.59	6.58	.00	
2-JMS099.30	7/19/2005	M	7.00	30.53	7.54	6.44	.00	
2-JMS099.30	7/19/2005	M	9.00	30.49	7.51	6.48	.00	
2-JMS099.30	7/19/2005	M	11.00	30.49	7.44	6.30	.00	
2-JMS099.30	7/19/2005	B	12.00	30.46	7.44	6.35	.00	
2-JMS099.30	8/23/2005	S	.10					
2-JMS099.30	8/23/2005	S	.30					
2-JMS099.30	8/23/2005	M	.50					
2-JMS099.30	8/23/2005	S	1.00	29.90	7.36	6.22	.00	
2-JMS099.30	8/23/2005	M	1.00					
2-JMS099.30	8/23/2005	M	1.50					
2-JMS099.30	8/23/2005	M	2.00					
2-JMS099.30	8/23/2005	M	2.50					
2-JMS099.30	8/23/2005	M	3.00	29.80	7.40	6.01	.00	
2-JMS099.30	8/23/2005	M	5.00	29.80	7.40	6.06	.00	
2-JMS099.30	8/23/2005	M	7.00	29.90	7.48	6.13	.00	
2-JMS099.30	8/23/2005	M	9.00	29.80	7.43	6.09	.00	
2-JMS099.30	8/23/2005	B	10.00	29.80	7.43	6.06	.00	
2-JMS099.30	9/20/2005	S	.10					
2-JMS099.30	9/20/2005	M	.50					
2-JMS099.30	9/20/2005	M	1.00					
2-JMS099.30	9/20/2005	S	1.00	27.90	7.80	7.70	.00	
2-JMS099.30	9/20/2005	M	1.50					
2-JMS099.30	9/20/2005	M	3.00	27.50	7.63	7.06	.00	
2-JMS099.30	9/20/2005	M	5.00	27.50	7.63	7.14	.00	
2-JMS099.30	9/20/2005	M	7.00	27.60	7.77	7.34	.00	
2-JMS099.30	9/20/2005	M	9.00	27.60	7.71	7.23	.00	
2-JMS099.30	9/20/2005	M	11.00	27.60	7.70	7.25	.00	
2-JMS099.30	9/20/2005	B	12.00	27.60	7.72	7.24	.00	
2-JMS099.30	10/18/2005	S	.30					
2-JMS099.30	10/18/2005	S	1.00	19.10	7.31	8.43	.00	
2-JMS099.30	10/18/2005	M	3.00	19.00	7.38	8.34	.00	
2-JMS099.30	10/18/2005	M	5.00	18.90	7.41	8.30	.00	
2-JMS099.30	10/18/2005	M	7.00	18.90	7.41	8.19	.00	
2-JMS099.30	10/18/2005	M	9.00	18.90	7.42	7.75	.00	
2-JMS099.30	10/18/2005	M	11.00	18.90	7.38	6.08	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	10/18/2005	B	12.00	19.00	7.36	4.54	.00	
2-JMS099.30	11/15/2005	S	.30		7.67	9.22		
2-JMS099.30	11/15/2005	S	.10					
2-JMS099.30	11/15/2005	M	.50					
2-JMS099.30	11/15/2005	S	1.00	15.40	7.67	9.22	.00	
2-JMS099.30	11/15/2005	M	1.00					
2-JMS099.30	11/15/2005	M	1.50					
2-JMS099.30	11/15/2005	M	2.00					
2-JMS099.30	11/15/2005	M	2.50					
2-JMS099.30	11/15/2005	B	3.00					
2-JMS099.30	11/15/2005	M	3.00	14.90	7.65	9.17	.00	
2-JMS099.30	11/15/2005	M	5.00	14.90	7.65	9.16	.00	
2-JMS099.30	11/15/2005	M	7.00	14.70	7.61	9.13	.00	
2-JMS099.30	11/15/2005	M	9.00	14.70	7.56	9.03	.00	
2-JMS099.30	11/15/2005	M	11.00	14.70	7.56	8.97	.00	
2-JMS099.30	11/15/2005	B	12.00	14.70	7.59	9.01	.00	
2-JMS099.30	12/13/2005	S	1.00					
2-JMS099.30	12/13/2005	S	.30	4.05	7.21	12.80		
2-JMS099.30	12/21/2005	S	.10					
2-JMS099.30	12/21/2005	M	.50					
2-JMS099.30	12/21/2005	M	1.00					
2-JMS099.30	12/21/2005	S	1.00					
2-JMS099.30	12/21/2005	M	1.50					
2-JMS099.30	12/21/2005	B	2.00					
2-JMS099.30	12/21/2005	M	3.00	3.91	7.51	13.02	.00	
2-JMS099.30	12/21/2005	M	5.00	3.91	7.51	12.96	.00	
2-JMS099.30	12/21/2005	M	7.00	3.91	7.48	12.95	.00	
2-JMS099.30	12/21/2005	M	9.00	3.92	7.45	12.92	.00	
2-JMS099.30	12/21/2005	B	11.00	3.94	7.45	12.90	.00	
2-JMS099.30	1/17/2006	S	.00					
2-JMS099.30	1/17/2006	S	.10					
2-JMS099.30	1/17/2006	M	.50					
2-JMS099.30	1/17/2006	M	1.00					
2-JMS099.30	1/17/2006	S	1.00	5.90	7.47	12.52	.00	
2-JMS099.30	1/17/2006	M	3.00	5.90	7.46	12.57	.00	
2-JMS099.30	1/17/2006	M	5.00	5.90	7.44	12.61	.00	
2-JMS099.30	1/17/2006	M	7.00	5.90	7.33	12.64	.00	
2-JMS099.30	1/17/2006	M	9.00	5.90	7.26	12.63	.00	
2-JMS099.30	1/17/2006	B	10.00	5.90	7.26	12.67	.00	
2-JMS099.30	1/17/2006	S	.00					
2-JMS099.30	2/21/2006	S	.10					
2-JMS099.30	2/21/2006	M	.50					
2-JMS099.30	2/21/2006	M	1.00					
2-JMS099.30	2/21/2006	S	1.00	6.40	7.50	12.90	.00	
2-JMS099.30	2/21/2006	M	1.50					
2-JMS099.30	2/21/2006	M	2.00					
2-JMS099.30	2/21/2006	M	2.50					
2-JMS099.30	2/21/2006	M	3.00	6.30	7.61	12.91	.00	
2-JMS099.30	2/21/2006	M	3.50					
2-JMS099.30	2/21/2006	M	4.00					
2-JMS099.30	2/21/2006	B	4.00	6.30	7.50	13.00	.00	
2-JMS099.30	2/21/2006	M	4.50					
2-JMS099.30	2/21/2006	M	5.00					
2-JMS099.30	2/21/2006	B	5.50					
2-JMS099.30	3/20/2006	S	.10					
2-JMS099.30	3/20/2006	M	.50					
2-JMS099.30	3/20/2006	S	1.00	12.90	7.90	10.10		
2-JMS099.30	3/20/2006	M	1.00					
2-JMS099.30	3/20/2006	M	1.50					
2-JMS099.30	3/20/2006	M	2.00					
2-JMS099.30	3/20/2006	M	2.50					
2-JMS099.30	3/20/2006	M	3.00	12.90	7.90	10.10		

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	3/20/2006	M	3.50					
2-JMS099.30	3/20/2006	M	5.00	12.80	7.90	10.10		
2-JMS099.30	3/20/2006	M	7.00	12.80	7.90	10.10		
2-JMS099.30	3/20/2006	M	9.00	12.80	7.90	10.20		
2-JMS099.30	3/20/2006	B	11.00	12.80	7.80	10.20		
2-JMS099.30	4/26/2006	S	.10					
2-JMS099.30	4/26/2006	M	.50					
2-JMS099.30	4/26/2006	S	1.00	21.40	7.50	7.60	.00	
2-JMS099.30	4/26/2006	M	1.00					
2-JMS099.30	4/26/2006	M	1.50					
2-JMS099.30	4/26/2006	M	2.00					
2-JMS099.30	4/26/2006	M	2.50					
2-JMS099.30	4/26/2006	M	3.00	21.30	7.50	7.60	.00	
2-JMS099.30	4/26/2006	B	3.00					
2-JMS099.30	4/26/2006	M	5.00	21.30	7.50	7.60	.00	
2-JMS099.30	4/26/2006	M	7.00	21.20	7.50	7.60	.00	
2-JMS099.30	4/26/2006	M	9.00	21.20	7.50	7.70	.00	
2-JMS099.30	4/26/2006	B	11.00	21.20	7.50	7.60	.00	
2-JMS099.30	5/15/2006	S	.10					
2-JMS099.30	5/15/2006	M	.50					
2-JMS099.30	5/15/2006	S	1.00	21.00	7.80	7.20	.00	
2-JMS099.30	5/15/2006	M	1.00					
2-JMS099.30	5/15/2006	M	1.50					
2-JMS099.30	5/15/2006	M	2.00					
2-JMS099.30	5/15/2006	M	2.50					
2-JMS099.30	5/15/2006	M	3.00	21.10	7.70	7.20	.00	
2-JMS099.30	5/15/2006	M	3.50					
2-JMS099.30	5/15/2006	M	4.00					
2-JMS099.30	5/15/2006	B	4.50					
2-JMS099.30	5/15/2006	M	5.00	20.90	7.70	7.20	.00	
2-JMS099.30	5/15/2006	B	6.00	20.90	7.70	7.10	.00	
2-JMS099.30	6/21/2006	S	.30	27.80	7.60	7.20	.00	
2-JMS099.30	6/29/2006	S	.10					
2-JMS099.30	6/29/2006	S	1.00					
2-JMS099.30	7/24/2006	S	.10					
2-JMS099.30	7/24/2006	M	.50					
2-JMS099.30	7/24/2006	S	1.00	30.50	7.60	6.20	.00	
2-JMS099.30	7/24/2006	M	1.00					
2-JMS099.30	7/24/2006	M	1.50					
2-JMS099.30	7/24/2006	M	2.00					
2-JMS099.30	7/24/2006	M	2.50					
2-JMS099.30	7/24/2006	M	3.00	30.00	7.50	5.80	.00	
2-JMS099.30	7/24/2006	B	3.50					
2-JMS099.30	7/24/2006	M	5.00	29.50	7.50	5.70	.00	
2-JMS099.30	7/24/2006	M	7.00	29.30	7.50	5.60	.00	
2-JMS099.30	7/24/2006	M	9.00	29.30	7.50	5.70	.00	
2-JMS099.30	7/24/2006	B	10.00	29.30	7.50	5.70	.00	
2-JMS099.30	8/22/2006	S	.10					
2-JMS099.30	8/22/2006	M	.50					
2-JMS099.30	8/22/2006	B	1.00					
2-JMS099.30	8/22/2006	S	1.00	31.30	7.70	7.30	.00	
2-JMS099.30	8/22/2006	M	3.00	30.50	7.60	7.10	.00	
2-JMS099.30	8/22/2006	M	5.00	29.90	7.60	6.90	.00	
2-JMS099.30	8/22/2006	M	7.00	30.00	7.60	7.10	.00	
2-JMS099.30	8/22/2006	B	9.00	29.60	7.40	6.30	.00	
2-JMS099.30	9/27/2006	S	.10					
2-JMS099.30	9/27/2006	S	1.00	23.30	7.60	8.20	.00	
2-JMS099.30	10/30/2006	S	.10					
2-JMS099.30	10/30/2006	M	.50					
2-JMS099.30	10/30/2006	S	1.00	11.80	7.40	10.00	.00	
2-JMS099.30	10/30/2006	M	1.00					
2-JMS099.30	10/30/2006	M	1.50					

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	10/30/2006	M	3.00	11.80	7.40	10.00	.00	
2-JMS099.30	10/30/2006	M	5.00	11.80	7.40	10.10	.00	
2-JMS099.30	10/30/2006	M	7.00	11.80	7.40	10.10	.00	
2-JMS099.30	10/30/2006	M	9.00	11.80	7.40	10.20	.00	
2-JMS099.30	10/30/2006	B	10.00	11.80	7.40	10.40	.00	
2-JMS099.30	11/15/2006	S	.10					
2-JMS099.30	11/15/2006	M	.50					
2-JMS099.30	11/15/2006	M	1.00					
2-JMS099.30	11/15/2006	S	1.00	12.70	7.30	9.70	.00	
2-JMS099.30	11/15/2006	M	3.00	12.70	7.30	9.60	.00	
2-JMS099.30	11/15/2006	M	5.00	12.60	7.30	9.70	.00	
2-JMS099.30	11/15/2006	M	7.00	12.70	7.30	9.70	.00	
2-JMS099.30	11/15/2006	M	9.00	12.70	7.30	9.80	.00	
2-JMS099.30	11/15/2006	B	10.00	12.70	7.40	9.90	.00	
2-JMS099.30	12/18/2006	S	1.00	7.50	7.20	12.20	.00	
2-JMS099.30	1/24/2007	S	.10					
2-JMS099.30	1/24/2007	M	.50					
2-JMS099.30	1/24/2007	M	1.00					
2-JMS099.30	1/24/2007	S	1.00	5.20	7.80	12.20	.00	
2-JMS099.30	1/24/2007	M	1.50					
2-JMS099.30	1/24/2007	M	2.00					
2-JMS099.30	1/24/2007	M	2.50					
2-JMS099.30	1/24/2007	M	3.00	5.20	7.80	12.20	.00	
2-JMS099.30	1/24/2007	M	3.50					
2-JMS099.30	1/24/2007	M	4.00					
2-JMS099.30	1/24/2007	M	4.50					
2-JMS099.30	1/24/2007	M	5.00	5.20	7.80	12.30	.00	
2-JMS099.30	1/24/2007	M	7.00	5.20	7.80	12.20	.00	
2-JMS099.30	1/24/2007	M	9.00	5.20	7.80	12.20	.00	
2-JMS099.30	1/24/2007	B	10.00	5.20	7.80	12.30	.00	
2-JMS099.30	2/20/2007	S	.10					
2-JMS099.30	2/20/2007	M	.50					
2-JMS099.30	2/20/2007	S	1.00	3.30	7.50	13.10	.00	
2-JMS099.30	2/20/2007	M	1.00					
2-JMS099.30	2/20/2007	M	1.50					
2-JMS099.30	2/20/2007	M	2.00					
2-JMS099.30	2/20/2007	M	3.00	3.20	7.50	13.10	.00	
2-JMS099.30	2/20/2007	M	5.00	3.10	7.50	13.20	.00	
2-JMS099.30	2/20/2007	M	7.00	3.10	7.50	13.30	.00	
2-JMS099.30	2/20/2007	B	8.00	3.20	7.40	13.30	.00	
2-JMS099.30	3/19/2007	S	.10					
2-JMS099.30	3/19/2007	M	.50					
2-JMS099.30	3/19/2007	S	1.00	8.30	7.20	11.60	.00	
2-JMS099.30	3/19/2007	M	1.00					
2-JMS099.30	3/19/2007	M	3.00	8.30	7.20	11.60	.00	
2-JMS099.30	3/19/2007	M	5.00	8.30	7.20	11.50	.00	
2-JMS099.30	3/19/2007	M	7.00	8.30	7.10	11.60	.00	
2-JMS099.30	3/19/2007	M	9.00	8.30	7.10	11.60	.00	
2-JMS099.30	3/19/2007	B	11.00	8.30	7.10	11.60	.00	
2-JMS099.30	4/30/2007	S	1.00	21.30	8.10	9.00	.00	
2-JMS099.30	4/30/2007	M	3.00	20.10	8.00	8.90	.00	
2-JMS099.30	4/30/2007	M	5.00	20.00	7.90	8.80	.00	
2-JMS099.30	4/30/2007	M	7.00	19.90	7.90	8.80	.00	
2-JMS099.30	4/30/2007	M	9.00	19.90	7.80	8.80	.00	
2-JMS099.30	4/30/2007	B	10.00	19.90	7.80	8.90	.00	
2-JMS099.30	5/30/2007	S	1.00	27.70	7.70	7.00	.00	
2-JMS099.30	5/30/2007	M	2.00	27.50	7.60	6.70	.00	
2-JMS099.30	5/30/2007	M	3.00	27.20	7.50	6.40	.00	
2-JMS099.30	5/30/2007	M	4.00	27.10	7.50	6.40	.00	
2-JMS099.30	5/30/2007	M	5.00	27.00	7.50	6.40	.00	
2-JMS099.30	5/30/2007	M	6.00	27.00	7.50	6.10	.00	
2-JMS099.30	5/30/2007	M	7.00	26.90	7.50	6.10	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	5/30/2007	M	8.00	26.90	7.50	6.10	.00	
2-JMS099.30	5/30/2007	M	9.00	26.90	7.50	6.00	.00	
2-JMS099.30	5/30/2007	B	10.00	26.90	7.50	6.10	.00	
2-JMS099.30	6/18/2007	S	1.00	26.40	7.70	7.60	.00	
2-JMS099.30	6/18/2007	M	2.00	25.90	7.60	7.20	.00	
2-JMS099.30	6/18/2007	M	3.00	25.60	7.50	7.10	.00	
2-JMS099.30	6/18/2007	M	4.00	25.50	7.50	7.00	.00	
2-JMS099.30	6/18/2007	M	5.00	25.40	7.50	7.00	.00	
2-JMS099.30	6/18/2007	M	6.00	25.30	7.50	7.00	.00	
2-JMS099.30	6/18/2007	M	7.00	25.30	7.50	6.90	.00	
2-JMS099.30	6/18/2007	M	8.00	25.30	7.40	6.90	.00	
2-JMS099.30	6/18/2007	M	9.00	25.20	7.40	6.90	.00	
2-JMS099.30	6/18/2007	B	10.00	25.20	7.40	6.90	.00	
2-JMS099.30	7/23/2007	S	1.00	28.70	7.60	6.50	.00	
2-JMS099.30	7/23/2007	M	2.00	28.60	7.60	6.30	.00	
2-JMS099.30	7/23/2007	M	3.00	28.60	7.60	6.20	.00	
2-JMS099.30	7/23/2007	M	4.00	28.50	7.50	6.10	.00	
2-JMS099.30	7/23/2007	M	5.00	28.50	7.50	6.00	.00	
2-JMS099.30	7/23/2007	M	6.00	28.50	7.50	6.00	.00	
2-JMS099.30	7/23/2007	M	7.00	28.40	7.50	5.90	.00	
2-JMS099.30	7/23/2007	M	8.00	28.40	7.50	5.70	.00	
2-JMS099.30	7/23/2007	M	9.00	28.40	7.50	5.70	.00	
2-JMS099.30	7/23/2007	M	10.00	28.40	7.50	5.80	.00	
2-JMS099.30	7/23/2007	B	11.00	28.30	7.40	5.70	.00	
2-JMS099.30	8/20/2007	S	1.00	27.70	7.10	4.10	.00	
2-JMS099.30	8/20/2007	M	2.00	27.70	7.10	4.10	.00	
2-JMS099.30	8/20/2007	M	3.00	27.70	7.10	4.10	.00	
2-JMS099.30	8/20/2007	M	4.00	27.70	7.00	4.20	.00	
2-JMS099.30	8/20/2007	M	5.00	27.70	7.10	4.10	.00	
2-JMS099.30	8/20/2007	M	6.00	27.70	7.10	4.10	.00	
2-JMS099.30	8/20/2007	M	7.00	27.70	7.10	4.10	.00	
2-JMS099.30	8/20/2007	M	8.00	27.70	7.10	4.20	.00	
2-JMS099.30	8/20/2007	B	9.00	27.70	7.00	4.20	.00	
2-JMS099.30	9/24/2007	S	1.00	29.80	8.60	10.20	.00	
2-JMS099.30	9/24/2007	M	2.00	28.10	8.30	9.40	.00	
2-JMS099.30	9/24/2007	M	3.00	27.50	8.40	10.00	.00	
2-JMS099.30	9/24/2007	M	4.00	26.90	8.20	9.10	.00	
2-JMS099.30	9/24/2007	M	5.00	26.70	8.20	9.00	.00	
2-JMS099.30	9/24/2007	M	6.00	26.70	8.10	8.70	.00	
2-JMS099.30	9/24/2007	M	7.00	25.20	7.80	7.40	.00	
2-JMS099.30	9/24/2007	M	8.00	25.10	7.80	7.40	.00	
2-JMS099.30	9/24/2007	M	9.00	25.10	7.80	7.50	.00	
2-JMS099.30	9/24/2007	B	10.00	25.00	7.80	7.50	.00	
2-JMS099.30	10/22/2007	S	1.00	26.30	8.40	9.40		
2-JMS099.30	10/22/2007	M	2.00	25.00	8.00	8.50		
2-JMS099.30	10/22/2007	M	3.00	24.50	8.00	8.30		
2-JMS099.30	10/22/2007	M	4.00	24.00	7.80	7.70		
2-JMS099.30	10/22/2007	M	5.00	23.70	7.80	7.60		
2-JMS099.30	10/22/2007	M	6.00	23.40	7.80	7.50		
2-JMS099.30	10/22/2007	M	7.00	23.30	7.80	7.50		
2-JMS099.30	10/22/2007	M	8.00	23.30	7.80	7.50		
2-JMS099.30	10/22/2007	M	9.00	23.30	7.80	7.50		
2-JMS099.30	10/22/2007	M	10.00	23.30	7.80	7.60		
2-JMS099.30	10/22/2007	B	11.00	23.30	7.80	7.60		
2-JMS099.30	11/13/2007	S	1.00	11.90	7.60	9.50	.00	
2-JMS099.30	11/13/2007	M	2.00	11.80	7.60	9.60	.00	
2-JMS099.30	11/13/2007	M	3.00	11.80	7.60	9.60	.00	
2-JMS099.30	11/13/2007	M	4.00	11.70	7.60	9.60	.00	
2-JMS099.30	11/13/2007	M	5.00	11.70	7.60	9.60	.00	
2-JMS099.30	11/13/2007	M	6.00	11.70	7.60	9.60	.00	
2-JMS099.30	11/13/2007	M	7.00	11.70	7.60	9.60	.00	
2-JMS099.30	11/13/2007	M	8.00	11.70	7.60	9.70	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	11/13/2007	M	9.00	11.70	7.60	9.70	.00	
2-JMS099.30	11/13/2007	B	10.00	11.60	7.60	9.80	.00	
2-JMS099.30	12/10/2007	S	1.00	7.60	7.40	11.20	.00	
2-JMS099.30	12/10/2007	M	2.00	7.70	7.40	11.10	.00	
2-JMS099.30	12/10/2007	M	3.00	7.60	7.40	11.00	.00	
2-JMS099.30	12/10/2007	M	4.00	7.50	7.40	11.10	.00	
2-JMS099.30	12/10/2007	M	5.00	7.50	7.40	11.00	.00	
2-JMS099.30	12/10/2007	M	6.00	7.60	7.40	11.00	.00	
2-JMS099.30	12/10/2007	M	7.00	7.60	7.40	11.00	.00	
2-JMS099.30	12/10/2007	M	8.00	7.60	7.40	11.00	.00	
2-JMS099.30	12/10/2007	M	9.00	7.70	7.40	11.10	.00	
2-JMS099.30	12/10/2007	B	10.00	7.80	7.40	11.20	.00	
2-JMS099.30	1/23/2008	S	.00					
2-JMS099.30	1/23/2008	S	1.00	3.40	7.20	13.10	.00	
2-JMS099.30	1/23/2008	M	2.00	3.40	7.20	13.10	.00	
2-JMS099.30	1/23/2008	M	3.00	3.40	7.20	13.10	.00	
2-JMS099.30	1/23/2008	M	4.00	3.40	7.20	13.10	.00	
2-JMS099.30	1/23/2008	M	5.00	3.40	7.20	13.20	.00	
2-JMS099.30	1/23/2008	M	6.00	3.40	7.20	13.20	.00	
2-JMS099.30	1/23/2008	M	7.00	3.40	7.20	13.20	.00	
2-JMS099.30	1/23/2008	M	8.00	3.40	7.20	13.40	.00	
2-JMS099.30	1/23/2008	M	9.00	3.40	7.20	13.40	.00	
2-JMS099.30	1/23/2008	B	10.00	3.40	7.30	13.40	.00	
2-JMS099.30	2/14/2008	S	1.00	6.20	6.90	11.80	.00	
2-JMS099.30	2/14/2008	M	2.00	6.10	6.90	11.80	.00	
2-JMS099.30	2/14/2008	M	3.00	6.10	6.90	11.80	.00	
2-JMS099.30	2/14/2008	M	4.00	6.10	6.80	11.80	.00	
2-JMS099.30	2/14/2008	M	5.00	6.10	6.80	11.80	.00	
2-JMS099.30	2/14/2008	B	6.00	6.20	6.90	11.90	.00	
2-JMS099.30	3/18/2008	S	1.00	12.00	6.90	10.20	.00	
2-JMS099.30	3/18/2008	M	2.00	12.00	6.80	10.20	.00	
2-JMS099.30	3/18/2008	M	3.00	11.90	6.80	10.20	.00	
2-JMS099.30	3/18/2008	M	4.00	11.70	6.80	10.20	.00	
2-JMS099.30	3/18/2008	M	5.00	11.70	6.80	10.20	.00	
2-JMS099.30	3/18/2008	M	6.00	11.70	6.80	10.20	.00	
2-JMS099.30	3/18/2008	M	7.00	11.70	6.80	10.20	.00	
2-JMS099.30	3/18/2008	M	8.00	11.60	6.80	10.20	.00	
2-JMS099.30	3/18/2008	M	9.00	11.60	6.80	10.20	.00	
2-JMS099.30	3/18/2008	B	10.00	11.60	6.70	10.30	.00	
2-JMS099.30	4/15/2008	S	1.00	16.20	6.80	8.70	.00	
2-JMS099.30	4/15/2008	M	2.00	16.00	6.70	8.70	.00	
2-JMS099.30	4/15/2008	M	3.00	16.00	6.70	8.70	.00	
2-JMS099.30	4/15/2008	M	4.00	16.00	6.70	8.60	.00	
2-JMS099.30	4/15/2008	M	5.00	16.00	6.70	8.60	.00	
2-JMS099.30	4/15/2008	M	6.00	16.00	6.70	8.60	.00	
2-JMS099.30	4/15/2008	M	7.00	15.90	6.70	8.60	.00	
2-JMS099.30	4/15/2008	B	8.00	15.90	6.60		.00	
2-JMS099.30	5/22/2008	S	1.00	20.00	7.70	8.70		
2-JMS099.30	5/22/2008	M	2.00	19.90	7.70	8.70		
2-JMS099.30	5/22/2008	M	3.00	19.80	7.70	8.70		
2-JMS099.30	5/22/2008	M	4.00	19.80	7.70	8.70		
2-JMS099.30	5/22/2008	M	5.00	19.80	7.70	8.70		
2-JMS099.30	5/22/2008	M	6.00	19.80	7.70	8.70		
2-JMS099.30	5/22/2008	M	7.00	19.70	7.70	8.70		
2-JMS099.30	5/22/2008	M	8.00	19.70	7.70	8.70		
2-JMS099.30	5/22/2008	M	9.00	19.70	7.70	8.70		
2-JMS099.30	5/22/2008	B	10.00	19.70	7.70	8.70		
2-JMS099.30	6/17/2008	S	1.00	30.80	7.50	6.20	.00	
2-JMS099.30	6/17/2008	M	2.00	30.40	7.30	5.10	.00	
2-JMS099.30	6/17/2008	M	3.00	30.40	7.40	5.20	.00	
2-JMS099.30	6/17/2008	M	4.00	30.30	7.30	5.00	.00	
2-JMS099.30	6/17/2008	M	5.00	30.30	7.30	4.90	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	6/17/2008	M	6.00	30.30	7.30	4.90	.00	
2-JMS099.30	6/17/2008	M	7.00	30.30	7.30	4.90	.00	
2-JMS099.30	6/17/2008	M	8.00	30.30	7.30	5.00	.00	
2-JMS099.30	6/17/2008	M	9.00	30.30	7.30	5.00	.00	
2-JMS099.30	6/17/2008	M	10.00	30.30	7.30	5.10	.00	
2-JMS099.30	6/17/2008	B	11.00	30.30	7.30	5.10	.00	
2-JMS099.30	7/15/2008	S	1.00	29.40	7.70	6.50	.00	
2-JMS099.30	7/15/2008	M	2.00	28.80	7.60	6.50	.00	
2-JMS099.30	7/15/2008	M	3.00	28.50	7.50	5.80	.00	
2-JMS099.30	7/15/2008	M	4.00	28.40	7.50	5.80	.00	
2-JMS099.30	7/15/2008	M	5.00	28.30	7.50	5.70	.00	
2-JMS099.30	7/15/2008	M	6.00	28.30	7.50	5.60	.00	
2-JMS099.30	7/15/2008	M	7.00	28.30	7.50	5.60	.00	
2-JMS099.30	7/15/2008	M	8.00	28.30	7.50	5.60	.00	
2-JMS099.30	7/15/2008	M	9.00	28.30	7.50	5.60	.00	
2-JMS099.30	7/15/2008	B	10.00	28.30	7.50	5.70	.00	
2-JMS099.30	9/16/2008	S	1.00	26.80	7.20	6.00	.00	
2-JMS099.30	9/16/2008	M	2.00	26.70	7.20	6.00	.00	
2-JMS099.30	9/16/2008	M	3.00	26.70	7.20	6.00	.00	
2-JMS099.30	9/16/2008	M	4.00	26.70	7.20	6.00	.00	
2-JMS099.30	9/16/2008	M	5.00	26.70	7.20	6.00	.00	
2-JMS099.30	9/16/2008	B	6.00	26.60	7.20	5.90	.00	
2-JMS099.30	10/21/2008	S	1.00	19.30	7.70	8.00	.00	
2-JMS099.30	10/21/2008	M	2.00	19.20	7.70	7.80	.00	
2-JMS099.30	10/21/2008	M	3.00	19.20	7.70	7.70	.00	
2-JMS099.30	10/21/2008	M	4.00	19.20	7.70	7.60	.00	
2-JMS099.30	10/21/2008	M	5.00	19.20	7.70	7.50	.00	
2-JMS099.30	10/21/2008	M	6.00	19.20	7.70	7.50	.00	
2-JMS099.30	10/21/2008	M	7.00	19.20	7.70	7.60	.00	
2-JMS099.30	10/21/2008	M	8.00	19.20	7.70	7.70	.00	
2-JMS099.30	10/21/2008	M	9.00	19.20	7.60	7.90	.00	
2-JMS099.30	10/21/2008	B	10.00	19.10	7.60	8.10	.00	
2-JMS099.30	11/24/2008	S	1.00	8.00	7.80	11.80	.00	
2-JMS099.30	11/24/2008	M	2.00	8.10	7.80	11.80	.00	
2-JMS099.30	11/24/2008	M	3.00	7.80	7.80	11.80	.00	
2-JMS099.30	11/24/2008	M	4.00	7.70	7.80	11.80	.00	
2-JMS099.30	11/24/2008	M	5.00	7.60	7.80	11.90	.00	
2-JMS099.30	11/24/2008	M	6.00	7.60	7.80	12.00	.00	
2-JMS099.30	11/24/2008	M	7.00	7.60	7.80	11.90	.00	
2-JMS099.30	11/24/2008	M	8.00	7.60	7.80	11.90	.00	
2-JMS099.30	11/24/2008	M	9.00	7.60	7.90	11.90	.00	
2-JMS099.30	11/24/2008	M	10.00	7.60	7.90	12.00	.00	
2-JMS099.30	11/24/2008	M	11.00	7.50	7.90	12.00	.00	
2-JMS099.30	11/24/2008	B	12.00	7.50	7.90	12.10	.00	
2-JMS099.30	12/9/2008	S	1.00	5.60	7.90	13.10	.00	
2-JMS099.30	12/9/2008	M	2.00	5.50	7.90	13.10	.00	
2-JMS099.30	12/9/2008	M	3.00	5.40	7.90	13.10	.00	
2-JMS099.30	12/9/2008	M	4.00	5.40	7.90	13.10	.00	
2-JMS099.30	12/9/2008	M	5.00	5.40	8.00	13.20	.00	
2-JMS099.30	12/9/2008	M	6.00	5.30	8.00	13.20	.00	
2-JMS099.30	12/9/2008	M	7.00	5.30	8.00	13.40	.00	
2-JMS099.30	12/9/2008	M	8.00	5.30	8.10	13.40	.00	
2-JMS099.30	12/9/2008	B	9.00	5.30	8.10	13.40	.00	
2-JMS099.30	1/21/2009	S	1.00	1.00	7.40	13.70	.00	
2-JMS099.30	1/21/2009	M	2.00	1.00	7.40	13.80	.00	
2-JMS099.30	1/21/2009	M	3.00	1.00	7.40	13.80	.00	
2-JMS099.30	1/21/2009	M	4.00	1.00	7.40	13.80	.00	
2-JMS099.30	1/21/2009	M	5.00	1.00	7.40	13.90	.00	
2-JMS099.30	1/21/2009	M	6.00	1.00	7.40	14.00	.00	
2-JMS099.30	1/21/2009	M	7.00	1.00	7.40	14.00	.00	
2-JMS099.30	1/21/2009	M	8.00	1.00	7.40	14.00	.00	
2-JMS099.30	1/21/2009	B	9.00	1.00	7.40	14.00	.00	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	2/19/2009	S	1.00	7.50	6.30	11.30	.00	
2-JMS099.30	2/19/2009	M	2.00	7.50	6.30	11.30	.00	
2-JMS099.30	2/19/2009	M	3.00	7.50	6.20	11.30	.00	
2-JMS099.30	2/19/2009	M	4.00	7.50	6.10	11.30	.00	
2-JMS099.30	2/19/2009	M	5.00	7.50	6.00	11.30	.00	
2-JMS099.30	2/19/2009	M	6.00	7.50	5.80	11.30	.00	
2-JMS099.30	2/19/2009	M	7.00	7.50	5.80	11.30	.00	
2-JMS099.30	2/19/2009	M	8.00	7.40	5.60	11.20	.00	
2-JMS099.30	2/19/2009	M	9.00	7.40	4.80	10.60	.00	
2-JMS099.30	2/19/2009	M	10.00	7.30	4.80	10.50	.00	
2-JMS099.30	2/19/2009	B	11.00	7.40	4.70	10.60	.00	
2-JMS099.30	3/17/2009	S	1.00	9.60	7.40	10.50	.00	
2-JMS099.30	3/17/2009	M	2.00	9.60	7.40	10.60	.00	
2-JMS099.30	3/17/2009	M	3.00	9.60	7.50	10.60	.00	
2-JMS099.30	3/17/2009	M	4.00	9.60	7.50	10.70	.00	
2-JMS099.30	3/17/2009	M	5.00	9.50	7.50	10.70	.00	
2-JMS099.30	3/17/2009	M	6.00	9.50	7.50	10.80	.00	
2-JMS099.30	3/17/2009	M	7.00	9.50	7.50	10.80	.00	
2-JMS099.30	3/17/2009	M	8.00	9.50	7.50	11.00	.00	
2-JMS099.30	3/17/2009	M	9.00	9.50	7.50	10.90	.00	
2-JMS099.30	3/17/2009	B	10.00	9.50	7.40	11.10	.00	
2-JMS099.30	4/30/2009	S	1.00	21.10	7.40	8.40		
2-JMS099.30	4/30/2009	M	2.00	21.00	7.40	8.40		
2-JMS099.30	4/30/2009	M	3.00	21.00	7.40	8.40		
2-JMS099.30	4/30/2009	M	4.00	21.00	7.40	8.50		
2-JMS099.30	4/30/2009	M	5.00	21.00	7.40	8.50		
2-JMS099.30	4/30/2009	M	6.00	21.00	7.40	8.50		
2-JMS099.30	4/30/2009	M	7.00	20.90	7.40	8.50		
2-JMS099.30	4/30/2009	B	8.00	20.90	7.40	8.50		
2-JMS099.30	5/19/2009	S	1.00	18.90	7.60	9.10		
2-JMS099.30	5/19/2009	M	2.00	18.90	7.60	9.00		
2-JMS099.30	5/19/2009	M	3.00	18.90	7.60	9.20		
2-JMS099.30	5/19/2009	M	4.00	18.90	7.60	9.30		
2-JMS099.30	5/19/2009	M	5.00	18.90	7.70	9.30		
2-JMS099.30	5/19/2009	M	6.00	18.90	7.70	9.30		
2-JMS099.30	5/19/2009	M	7.00	18.80	7.70	9.40		
2-JMS099.30	5/19/2009	M	8.00	18.80	7.70	9.40		
2-JMS099.30	5/19/2009	B	9.00	18.80	7.70	9.50		
2-JMS099.30	6/16/2009	S	1.00	26.70	7.40	7.40		
2-JMS099.30	6/16/2009	M	2.00	26.70	7.40	7.40		
2-JMS099.30	6/16/2009	M	3.00	26.70	7.40	7.40		
2-JMS099.30	6/16/2009	M	4.00	26.70	7.40	7.40		
2-JMS099.30	6/16/2009	M	5.00	26.70	7.40	7.40		
2-JMS099.30	6/16/2009	M	6.00	26.70	7.40	7.40		
2-JMS099.30	6/16/2009	M	7.00	26.60	7.40	7.40		
2-JMS099.30	6/16/2009	M	8.00	26.60	7.40	7.40		
2-JMS099.30	6/16/2009	M	9.00	26.60	7.40	7.40		
2-JMS099.30	6/16/2009	B	10.00	26.60	7.40	7.40		
2-JMS099.30	7/21/2009	S	1.00	28.50	7.20	5.70		
2-JMS099.30	7/21/2009	M	2.00	28.40	7.20	5.70		
2-JMS099.30	7/21/2009	M	3.00	28.40	7.20	5.70		
2-JMS099.30	7/21/2009	M	4.00	28.40	7.20	5.70		
2-JMS099.30	7/21/2009	M	5.00	28.40	7.20	5.70		
2-JMS099.30	7/21/2009	M	6.00	28.30	7.20	5.60		
2-JMS099.30	7/21/2009	M	7.00	28.10	7.10	5.40		
2-JMS099.30	7/21/2009	M	8.00	28.00	7.10	5.30		
2-JMS099.30	7/21/2009	M	9.00	28.00	7.10	5.30		
2-JMS099.30	7/21/2009	B	10.00	28.00	7.10	5.40		
2-JMS099.30	8/18/2009	S	1.00	32.40	8.20	7.20		
2-JMS099.30	8/18/2009	M	2.00	31.80	8.20	7.00		
2-JMS099.30	8/18/2009	M	3.00	31.30	8.10	6.80		
2-JMS099.30	8/18/2009	M	4.00	30.80	8.00	6.50		

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Salinity	Do Winkler
2-JMS099.30	8/18/2009	M	5.00	30.60	8.00	6.40		
2-JMS099.30	8/18/2009	M	6.00	30.30	7.90	6.30		
2-JMS099.30	8/18/2009	M	7.00	30.30	7.90	6.30		
2-JMS099.30	8/18/2009	M	8.00	30.20	7.90	6.20		
2-JMS099.30	8/18/2009	M	9.00	30.10	7.90	6.20		
2-JMS099.30	8/18/2009	M	10.00	30.10	7.90	6.20		
2-JMS099.30	8/18/2009	M	11.00	30.00	7.90	6.20		
2-JMS099.30	8/18/2009	B	12.00	30.00	7.90	6.20		
2-JMS099.30	9/15/2009	S	1.00	28.30	8.40	9.60		
2-JMS099.30	9/15/2009	M	2.00	26.90	7.90	8.50		
2-JMS099.30	9/15/2009	M	3.00	25.70	7.70	7.60		
2-JMS099.30	9/15/2009	M	4.00	25.50	7.60	7.20		
2-JMS099.30	9/15/2009	M	5.00	25.50	7.60	7.00		
2-JMS099.30	9/15/2009	M	6.00	25.50	7.60	7.10		
2-JMS099.30	9/15/2009	M	7.00	25.40	7.60	7.20		
2-JMS099.30	9/15/2009	B	8.00	24.70	7.60	6.80		
2-JMS099.30	10/28/2009	S	1.00	16.80	7.70	8.40		
2-JMS099.30	10/28/2009	M	2.00	16.70	7.70	8.40		
2-JMS099.30	10/28/2009	M	3.00	16.70	7.70	8.30		
2-JMS099.30	10/28/2009	M	4.00	16.70	7.70	8.30		
2-JMS099.30	10/28/2009	M	5.00	16.60	7.70	8.30		
2-JMS099.30	10/28/2009	M	6.00	16.60	7.70	8.30		
2-JMS099.30	10/28/2009	M	7.00	16.60	7.70	8.30		
2-JMS099.30	10/28/2009	M	8.00	16.60	7.70	8.40		
2-JMS099.30	10/28/2009	M	9.00	16.60	7.70	8.50		
2-JMS099.30	10/28/2009	B	10.00	16.60	7.70	8.50		
2-JMS099.30	11/9/2009	S	1.00	13.10	7.70	10.60		
2-JMS099.30	11/9/2009	M	2.00	12.90	7.70	10.70		
2-JMS099.30	11/9/2009	M	3.00	12.90	7.70	10.60		
2-JMS099.30	11/9/2009	M	4.00	12.80	7.70	10.70		
2-JMS099.30	11/9/2009	M	5.00	12.80	7.70	10.70		
2-JMS099.30	11/9/2009	M	6.00	12.80	7.80	10.70		
2-JMS099.30	11/9/2009	M	7.00	12.80	7.80	10.80		
2-JMS099.30	11/9/2009	M	8.00	12.80	7.90	10.80		
2-JMS099.30	11/9/2009	B	9.00	12.90	7.90	10.80		
2-JMS099.30	12/8/2009	S	1.00	6.80	6.90	11.90		
2-JMS099.30	12/8/2009	M	2.00	6.80	6.80	11.90		
2-JMS099.30	12/8/2009	M	3.00	6.80	6.80	11.90		
2-JMS099.30	12/8/2009	M	4.00	6.80	6.80	11.90		
2-JMS099.30	12/8/2009	M	5.00	6.80	6.80	11.90		
2-JMS099.30	12/8/2009	M	6.00	6.80	6.80	12.00		
2-JMS099.30	12/8/2009	M	7.00	6.80	6.70	11.90		
2-JMS099.30	12/8/2009	B	8.00	6.80	6.70	11.90		
90th Percentile				29.1	7.9			
10th Percentile				6.1	7.1			

Fact Sheet
Proctors Creek WWTP

Attachment D

Site Visit

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Wastewater Facility Inspection Report

Facility Name:	<u>Proctors Creek WWTP</u>			Facility No.:	<u>VA0060194</u>	
City/County:	<u>Chesterfield County</u>			Inspection Agency:	<u>DEQ</u>	
Inspection Date:	<u>June 15, 2010 (0916-1207)</u>			Date Form Completed:	<u>July 15, 2010</u>	
Inspector:	<u>Heather Horne</u>			Time Spent:	<u>40 hrs. w/ travel & report</u>	
Reviewed By:						
Present at Inspection: <u>Terry Cheatham, Chief Operator John Kidd, Assistant Chief Operator, Scott Smedley, Plant Manager; Meredith Williams, DEQ inspector; Gina Kelly and Janine Howard, DEQ Permit Writers</u>						
TYPE OF FACILITY:						
<u>Domestic</u>			<u>Industrial</u>			
<input type="checkbox"/> Federal	<input checked="" type="checkbox"/> Major		<input type="checkbox"/> Major	<input type="checkbox"/> Primary		
<input checked="" type="checkbox"/> Non-Federal	<input type="checkbox"/> Minor		<input type="checkbox"/> Minor	<input type="checkbox"/> Secondary		
Population Served:	<u>approx.: 130,000</u>					
Number of Connections:	<u>approx.: 46,000</u>					
TYPE OF INSPECTION:						
<input checked="" type="checkbox"/> Routine	Date of last inspection: <u>September 21, 2007</u>					
<input type="checkbox"/> Compliance	Agency: <u>DEQ/PRO</u>					
<input type="checkbox"/> Reinspection						
EFFLUENT MONITORING: See compliance File (ECM)						
Last month average:	BOD: __ mg/L		TSS: __ mg/L		Flow: __ MGD	
(Influent) Date:						
Other:	<u>mg/L</u>					
Last month average:	BOD: __ mg/L		TSS: __ mg/L		Flow: __ MGD	
(Effluent) Date:						
Other:						
Quarter average:	BOD: __ mg/L		TSS: __ mg/L		Flow: __ MGD	
(Effluent) Date:						
Other:						
CHANGES AND/OR CONSTRUCTION						
DATA VERIFIED IN PREFACE		<input type="checkbox"/> Updated <input checked="" type="checkbox"/> No changes				
Has there been any new construction?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
If yes, were plans and specifications approved?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No* <input type="checkbox"/> N/A				
DEQ approval date:		<u>DEQ- Office of Wastewater Engineering (WQIF)</u>				

(A) PLANT OPERATION AND MAINTENANCE

1. Class and number of licensed operators: Class I – 10; Class II – 2; Class III – 0; Trainee – 0
 2. Hours per day plant is staffed: 24 hours/day, 7 days/week

3. Describe adequacy of staffing: [x] Good [] Average [] Poor*
4. Does the plant have an established program for training personnel? [x] Yes [] No
5. Describe the adequacy of the training program: [x] Good [] Average [] Poor*
6. Are preventive maintenance tasks scheduled? [x] Yes [] No*
7. Describe the adequacy of maintenance: [] Good [x] Average [] Poor*
8. Does the plant experience any organic/hydraulic overloading? [x] Yes* [] No

If yes, identify cause and impact on plant: I&I. WWTP has successfully treated excess flows attributed to I&I

- Any bypassing since last inspection? [] Yes* [x] No
10. Is the on-site electric generator operational? [] Yes [] No* [x] N/A
11. Is the STP alarm system operational? [x] Yes [] No * [] N/A
12. How often is the standby generator exercised?
 Power Transfer Switch? [] Weekly [] Monthly [x] Other: N/A
 Alarm System? [] Weekly [x] Monthly [] Other:
13. When were the cross connection control devices last tested on the potable water service? 8/09
14. Is sludge disposed in accordance with the approved sludge disposal plan? [x] Yes [] No* [] N/A
15. Is septage received by the facility? [x] Yes [] No
 Is septage loading controlled? [x] Yes [] No * [] N/A
 Are records maintained? [x] Yes [] No* [] N/A
16. Overall appearance of facility: [x] Good [] Average [] Poor*

Comments: #4 Training includes OJT, Short School, DEQ Lab Workshops, and an incentive program for operator license upgrade. #11 Alarm signals report to operator's control/enunciator panel and SCADA System. #12 Facility maintains two power feeds. #13 cross connection certifications performed by Patterson Plumbing. #14 The approved plan calls for land application by contractor.

(B) PLANT RECORDS

1. Which of the following records does the plant maintain?

Operational Logs for each unit process	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Instrument maintenance and calibration	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Mechanical equipment maintenance	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Industrial waste contribution (Municipal Facilities)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A

2. What does the operational log contain?

Visual Observations	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Flow Measurement	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Laboratory Results	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Process Adjustments	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Control Calculations	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Other:	<u>N/A</u>		

3. What do the mechanical equipment records contain:

As built plans and specs?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Spare parts inventory?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Manufacturers instructions?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Equipment/parts suppliers?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Lubrication schedules?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Other:	<u>N/A</u>		
Comments:	<u>None</u>		

4. What do the industrial waste contribution records contain:

Waste characteristics?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Locations and discharge types?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Impact on plant?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Other:	<u>None</u>		

5. Are the following records maintained at the plant:

Equipment maintenance records	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Operational Log	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Industrial contributor records	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Instrumentation records	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A
Sampling and testing records	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No*	<input type="checkbox"/> N/A

6. Are records maintained at a different location?

Where are the records maintained?
All are available on site.

7. Were the records reviewed during the inspection

Yes No

8. Are the records adequate and the O & M Manual current?

Yes No* N/A

9. Are the records maintained for required 3-year period?

Yes No*

Comments: The county performs routine monitoring of industrial contributors on the system. #8 The revised Operations and Maintenance Manual was approved by VDH on April 4, 1996. An updated manual to include plant upgrades is in progress.

(C) SAMPLING

- | | | | |
|--|---|---------|---------|
| 1. Are sampling locations capable of providing representative samples? | <input checked="" type="checkbox"/> Yes | [] No* | [] N/A |
| 2. Do sample types correspond to those required by the permit? | <input checked="" type="checkbox"/> Yes | [] No* | [] N/A |
| 3. Do sampling frequencies correspond to those required by the permit? | <input checked="" type="checkbox"/> Yes | [] No* | [] N/A |
| 4. Are composite samples collected in proportion to flow? | <input checked="" type="checkbox"/> Yes | [] No* | [] N/A |
| 5. Are composite samples refrigerated during collection? | <input checked="" type="checkbox"/> Yes | [] No* | [] N/A |
| 6. Does plant maintain required records of sampling? | <input checked="" type="checkbox"/> Yes | [] No* | [] N/A |
| 7. Does plant run operational control tests? | <input checked="" type="checkbox"/> Yes | [] No* | [] N/A |

Comments:**(D) TESTING**

- | | |
|------------------------------|---|
| 1. Who performs the testing? | <input checked="" type="checkbox"/> Plant/ Lab
<input type="checkbox"/> Central Lab
<input checked="" type="checkbox"/> Commercial Lab - Name: <u>J. R. Reed and Associates</u> |
|------------------------------|---|

If plant performs any testing, complete 2-4.

- | | |
|---|---|
| 2. What method is used for chlorine analysis? | <u>HACH Pocket Colorimeter II</u> |
| 3. Is sufficient equipment available to perform required tests? | <input checked="" type="checkbox"/> Yes [] No* [] N/A |
| 4. Does testing equipment appear to be clean and/or operable? | <input checked="" type="checkbox"/> Yes [] No* [] N/A |

Comments: The lab is in the process of VELAP certification. It currently holds interim certification.

(E) FOR INDUSTRIAL FACILITIES W/ TECHNOLOGY BASED LIMITS N/A

- | | |
|---|---|
| 1. Is the production process as described in the permit application? (If no, describe changes in comments) | <input type="checkbox"/> Yes [] No* <input checked="" type="checkbox"/> N/A |
| 2. Do products and production rates correspond to the permit application? (If no, list differences in comments section) | <input type="checkbox"/> Yes [] No* <input checked="" type="checkbox"/> N/A |
| 3. Has the State been notified of the changes and their impact on plant effluent? | <input type="checkbox"/> Yes [] No* <input checked="" type="checkbox"/> N/A |

Comments: None

FOLLOW UP TO COMPLIANCE RECOMMENDATIONS FROM 9/21/07 DEQ INSPECTION:

1. There were no compliance recommendations.

FOLLOW UP TO GENERAL RECOMMENDATIONS FROM 9/21/07 DEQ INSPECTION:

1. Please ensure the weirs of all secondary clarifiers are cleaned on a routine, scheduled basis. The weirs of secondary clarifier units 5 and 6 were in need of cleaning. No negative impact of effluent noted.
2. Please address the scum observed in the chlorine contact tank as soon as possible.

INSPECTION REPORT SUMMARY**Compliance Recommendations/Request for Corrective Action:**

1. None at this time.

General Recommendations:

1. Although the weirs were reportedly cleaned on the day prior to inspection, algal growth was noted causing some clogging on the weirs of the secondary clarifiers. No negative impact of effluent noted. Please monitor closely to ensure the weir cleaning schedule is adequate.

Comments:

This inspection was conducted during a transitional period in plant operations. The plant was undergoing renovations at the time of inspection. The drum screen building, digesters, and IFAS projects were all underway. Since the previous inspection, a Boscker screen, gravity sludge thickener, and two primary sludge digesters have gone on-line. The operation of this plant is different than the previous inspection and will be different during the next inspection. In general, and historically, this facility has been very well operated and maintained, and routinely produces an excellent quality effluent. Operators stated that thus far treatment has been minimally impacted from the renovation activities.

Areas of emphasis (Compliance Assessment) - check all that apply:

[X] Yes	[] No	Operational Units
[] Yes	[X] No	Evaluation of O & M Manual
[] Yes	[X] No	Maintenance Records
[] Yes	[X] No	Pathogen Reduction & Vector Attraction Reduction
[] Yes	[X] No	Sludge Disposal Plan
[] Yes	[] No	Groundwater Monitoring Plan
[] Yes	[X] No	Storm Water Pollution Prevention Plan
[X] Yes	[] No	Permit Special Conditions
[X] Yes	[] No	Permit Water Quality Chemical Monitoring
[X] Yes	[] No	Laboratory Records (see Lab Report)

UNIT PROCESS: Sewage Pumping

1. Name of station: Influent Pump Station (a.k.a. Proctors Creek Pump Station)

2. Location (if not at STP): N/A

3. Following equipment operable:

- | | | |
|---|---|--|
| a. all pumps? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* |
| b. ventilation? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* <input type="checkbox"/> N/A |
| c. control system? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* <input type="checkbox"/> N/A |
| d. sump pump? (Dry pit submersible pumps) | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* <input type="checkbox"/> N/A |
| e. seal water system? | <input type="checkbox"/> Yes | <input type="checkbox"/> No* <input checked="" type="checkbox"/> N/A |

4. Reliability considerations:

- | | | | |
|---|---|--|---|
| a. Class | <input checked="" type="checkbox"/> I | <input type="checkbox"/> II | <input type="checkbox"/> III |
| b. Alarm system operable? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| c. Alarm conditions monitored: | | | |
| 1. high water level: | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| 2. high liquid level in dry well: | <input type="checkbox"/> Yes | <input type="checkbox"/> No* | <input checked="" type="checkbox"/> N/A |
| 3. main electric power: | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| 4. auxiliary electric power: | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| 5. failure of pump motors to start: | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| 6. test function: | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | |
| 7. other: | | <u>N/A</u> | |
| d. Backup for alarm system operational? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| e. Alarm signal reported to (identify): | | | <u>local audible & visual, control room & SCADA</u> |
| f. Continuous operability provisions: | | | |
| 1. generator hook up? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | |
| 2. two sources of electricity? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | (two power feeds) |
| 3. portable pump? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | |
| 4. 1 day storage? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | |
| 5. other: | | <u>N/A</u> | |

5. Does station have bypass?

- | | | |
|-------------------------------|-------------------------------|--|
| a. evidence of bypass use? | <input type="checkbox"/> Yes* | <input checked="" type="checkbox"/> No |
| b. can bypass be disinfected? | <input type="checkbox"/> Yes | <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A |
| c. can bypass be measured? | <input type="checkbox"/> Yes | <input type="checkbox"/> No* <input checked="" type="checkbox"/> N/A |

6. How often is station checked? every two hours

7. General condition: Good Fair Poor*

Comments: Station equipped with eight pumps and two wet wells. All eight pumps have been replaced. All pumps were retrofitted to dry pit submersible pumps. Pumps are rotated automatically based on run time. Wastewater from this station discharges to the downstream side of the bar screen maintained for a separate influent line originating from the Falling Creek Pump Station (Turner Road).

UNIT PROCESS: Screening/Comminution(Influent Pump Station)

1. Number of units: Manual: 0 Mechanical: 1
 Number of units in operation: Manual: 0 Mechanical: 1
2. Bypass channel provided? [] Yes [x] No
 Bypass channel in use? [] Yes [x] No [] N/A
3. Area adequately ventilated? [x] Yes [] No*
4. Alarm system for equipment failure or overloads? [x] Yes [] No [] N/A
 If present, is the alarm system operational? [x] Yes [] No * [] N/A
5. Proper flow distribution between units? [] Yes [] No * [x] N/A
6. How often are units checked and cleaned? once every two hours
7. Cycle of operation: Timer activated every two hours; float activated back-up
8. Volume of screenings removed: ~ 4 cubic yards/week
9. General condition: [x] Good [] Fair [] Poor*

Comments: The Proctors Creek station now has a mechanical Boscker Screen system. This system rakes the bar screen, rises, and runs on a track to drop solids in a dumpster. Wastewater that drips is captured by drains that direct water back to the plant. One operational mechanical screen and one manual screen are maintained on the Falling Creek influent line. Waste Disposal Regulations require that screenings be stabilized (usually limed) prior to landfill disposal. The combined flow from the Influent Pump Station and the Falling Creek influent line enters "Junction Box No. 6" (aluminum sulfate addition as needed).

A septage receiving area is located next to the Falling Creek influent line. There are plans to decommission the barscreen on this line in September 2010. Trucks discharge septage to a pit with a manual bar screen that discharges to the head of the plant. The septage haulers rake the bar screen, as needed, and place screenings in the trash receptacle next to the bar screen.

At the time of inspection, the facility was in the process of constructing a drum screen building. Eventually this building will receive flow from both lines. The drum screens have been designed so each screen can handle peak flows individually. The system will have a jet sprayer backwash system.

UNIT PROCESS: Flow Measurement

Influent Intermediate Effluent

1. Type measuring device: Two mag meters with digital readouts

2. Present reading: Channel 1- 9.03 MGD; Channel 2- 9.04 MGD

3. Bypass channel? Yes No

Metered? Yes No* N/A

4. Return flows discharged upstream from meter? Yes No

If Yes, identify: Internal flows are returned to the EQ basin and pumped from there to Junction Box No. 6

5. Device operating properly? Yes No*

6. Date of last calibration: 8/5/09

7. Evidence of following problems:

a. obstructions? Yes* No

b. grease? Yes* No

8. General condition: Good Fair Poor*

Comments: #6: Instrument calibration performed by Industrial Controls of Sandston, VA.
The facility plans to remove circular flow charts during the plant renovation.

UNIT PROCESS: Grit Removal

1. Number of units: 4
 Number of units in operation: 1; 1 backup; 2 down for service
2. Unit adequately ventilated? Yes No *
3. Operation of grit collection equipment: Manual * Time clock Continuous duty
4. Proper flow distribution between units? Yes No * N/A
5. Daily volume of grit removed: ~ 3 cubic yards each week
6. All equipment operable? Yes No *
7. General condition: Good Fair Poor*

Comments: Flow from "Junction Box No. 6" goes to aerated grit channels. Grit Structure No. 2 was on line. Four dedicated blowers are maintained for grit removal – only one blower is operated at a time and manually rotated as needed. Wastewater from the Grit Removal Units recombines and enters the "Primary Distribution Structure" which is used to regulate flow to the East Train (newer) and the West Train (older). Grit goes to the landfill weekly.

UNIT PROCESS: Sedimentation (Clarifier)

<input checked="" type="checkbox"/> Primary	<input type="checkbox"/> Secondary	<input type="checkbox"/> Tertiary
---	------------------------------------	-----------------------------------

1. Number of units: _____
In operation: _____
2. Proper flow distribution between units? Yes No* N/A
3. Signs of short circuiting and/or overloads? Yes* No
4. Effluent weirs level?
Clean? Yes No*
5. Scum collection system working properly? Yes No* N/A
6. Sludge collection system working properly? Yes No* N/A
7. Influent, effluent baffle systems working properly? Yes No* N/A
8. Chemical addition?
Chemicals: _____
9. Effluent characteristics: _____
10. General condition: Good Fair Poor*

Comments: One out for service for routine maintenance (the facility may or may not fix this clarifier). Strong odors were observed at the primary clarifier. Weirs are washed as needed.

UNIT PROCESS: Sludge Pumping**(Primary Sludge to Digesters)**

1. Number of Pumps: 4 (2 East Train; 2 West Train)
 Number of pumps in operation: 2 (one on each train)
2. Type of sludge pumped: Primary Secondary Return Activated
 Combination Other:
3. Type of pump: Plunger Diaphragm Screwlift
 Centrifugal Progressing cavity Other:
4. Mode of operation: Manual Automatic Other:
5. Sludge volume pumped: Meter has not been installed yet
6. Alarm system for equipment failures or overloads operational? Yes No* N/A
7. General condition: Good Fair Poor*

Comments: Two simplex pumps serve the West Train; two peristaltic hose pumps serve the East Train. All pumps were reported to be operational. An intermediate well is present before the digesters. The well is equipped with one grinder and two progressive cavity pumps. Pumps are on a timer and automatically rotate hourly.

UNIT PROCESS: Activated Sludge Aeration

1. Number of units: 8
Number of units in operation: 8
2. Mode of operation: denitrification and conventional aeration w/ recirculation
3. Proper flow distribution between units? Yes No* N/A
4. Foam control operational? Yes No* N/A
5. Scum control operational? Yes No* N/A
6. Evidence of the following problems:
 a. dead spots? Yes* No
 b. excessive foam? Yes* No
 c. poor aeration? Yes* No
 d. excessive aeration? Yes* No
 e. excessive scum? Yes* No
 f. aeration equipment malfunction? Yes* No
 g. other:
7. Mixed liquor characteristics (as available) **AT1- June 15, 2010**
 pH: 6.7 SU MLSS: 5,320 mg/L
 DO: 1.3 mg/L SDI: 1.72
 SVI: 58 Color: Brown
 Odor: earthy Settleability: 310 mg/L in 30 minutes
 Other: F/M: 0.10; sludge age: 13.68 days
8. Return/waste sludge:
 a. return rate: #1-2: 7.2 MGD, #3-4: 3.3, #5-8: 9 MGD (avg)
 b. waste rate: Erratic- based on gravity belt thickener run times
 c. frequency of wasting: As needed.
9. Aeration system control: Time Clock Manual Continuous
 Other dissolved oxygen sensors (Hach LDO) tied to PLC on the East Train; 2.3 mg/L set value
10. Effluent control devices working properly? Yes No N/A (**oxidation ditches**)
11. General condition: Good Fair Poor *

Comments: Magnesium hydroxide (to raise alkalinity) and alum (to remove phosphorus) are added at the distribution box to facilitate denitrification. The East Train (denitrification) consists of four basins in parallel. Each basin has three anoxic zones (one mechanical mixer in each zone) followed by an aerated zone. Fine bubble diffused air is provided to the aerated zones by two dedicated blowers (one is in operation at a time) – all were operational. The diffused air system is equipped with PLC and in-line dissolved oxygen sensors. The mixed liquor is recirculated from the end of the last aerated zone to the head of the first anoxic zone. Good mixing was noted in the East Train. The West Train (conventional/denitrification) also consists of four basins in parallel. Each basin is divided into two zones – an anoxic zone and an aerated zone. Each zone is equipped with a mechanical mixer. All controls are manual. Blowers are rotated every six months.

The renovation plans for this plant include upgrading these trains to an Integrated Fixed Film Activated Sludge system.

UNIT PROCESS: Sedimentation (Clarifier)

<input type="checkbox"/> Primary	<input checked="" type="checkbox"/> Secondary	<input type="checkbox"/> Tertiary
----------------------------------	---	-----------------------------------

1. Number of units: _____
In operation: _____
2. Proper flow distribution between units? Yes No* N/A
3. Signs of short circuiting and/or overloads? Yes* No
4. Effluent weirs level?
Clean? Yes No*
5. Scum collection system working properly? Yes No* N/A
6. Sludge collection system working properly? Yes No* N/A
7. Influent, effluent baffle systems working properly? Yes No* N/A
8. Chemical addition?
Chemicals: Yes No
polymer – Polydyne-C
9. Effluent characteristics: clear
10. General condition: Good Fair Poor*

Comments: East Train consists of Units Nos. 5, 6, 7, & 8; West Train consists of Units Nos. 1, 2, 3, & 4. All sludge is returned or goes to the gravity belt thickener. Although the weirs were reportedly cleaned the day prior to inspection, algal mats were noted to be clogging some of the weirs.

UNIT PROCESS: Sludge Pumping(WAS to DAF)

1. Number of Pumps: 4
Number of pumps in operation: 2 at a time
2. Type of sludge pumped: Primary Secondary Return Activated
 Combination Other: WAS
3. Type of pump: Plunger Diaphragm Screwlift
 Centrifugal Progressing cavity Other:
4. Mode of operation: Manual Automatic Other:
5. Sludge volume pumped: 400,000 gallons per day
6. Alarm system for equipment failures or overloads operational? Yes No* N/A
7. General condition: Good Fair Poor*

Comments: Although operational, the DAF is not being used. Sludge is sent to the gravity belt thickener.

UNIT PROCESS: Sludge Pumping(RAS)

1. Number of Pumps: 12
Number of pumps in operation: 6
2. Type of sludge pumped: Primary Secondary Return Activated
 Combination Other:
3. Type of pump: Plunger Diaphragm Screwlift
 Centrifugal Progressing cavity Other:
4. Mode of operation: Manual Automatic Other:
5. Sludge volume pumped: Secondary clarifiers #1-2: 7.2 MGD, #3-4: 3.3, #5-8: 9 MGD (avg)
6. Alarm system for equipment failures or overloads operational? Yes No* N/A
7. General condition: Good Fair Poor*

Comments: All reported to be operational.

UNIT PROCESS: Floatation Thickening**(Dissolved Air Floatation -DAF)**

1. Number of units: 2
In of units in operation: 0; both operable
2. Floatation aid system provided? Yes No
Type of aid/dosage: Polymer has been employed in the past.
3. Sludge pumping: Manual Automatic
4. Skimmer blade removal system operating properly? Yes No
5. Sludge collection system operating properly? Yes No
6. Effluent baffle system working properly? Yes No
7. Is the unit used to thicken sludges other than WAS? Yes No
If not specify other sludge(s):
8. Signs of overloading? Yes No
9. Process control testing:
- a. Feed solids testing: Yes No %
 - b. Thickened sludge solids testing: Yes No %
 - c. Underflow testing: Yes No %
 - d. Other (specify): Yes No
10. Percent capture of solids: %
11. General condition: Good Fair Poor

Comments: The above questions are intentionally blank. This unit is operational, but not in use. The gravity belt thickener is being used in its place. DAF underflow is discharged to the Equalization Basins.

UNIT PROCESS: Gravity Thickening

1. Number of units: 3
Number of units in operation: #3 at the time of inspection; all operable
2. Types of sludge(s) fed to the thickener: Primary WAS Combination
 Other:
3. Solids concentration in the influent sludge: 1%
Solids concentration in thickened sludge: 4.5- 6 %
4. Sludge feeding: 800 gal/min
 Continuous Intermittent
5. Signs of short-circuiting and/or overloads? Yes* No
6. Effluent weirs level? Yes No * N/A
7. Sludge collection system work properly? Yes No * N/A
8. Influent, effluent baffle systems work properly? Yes No * N/A
9. Chemical addition?
Identify chemical/dose: Yes No * N/A
Zetag polymer: 0.26% solution; 3.1 gal/hr
10. General condition: Good Fair Poor*

Comments: Wastewater is returned to the pump station. Sludge is pumped to the digesters. One redundant machine present.

UNIT PROCESS: Sludge Pumping**(GBT to Digester)**

1. Number of Pumps: See comments
Number of pumps in operation: All operational.
2. Type of sludge pumped: Primary Secondary Return Activated
 Combination Other:
3. Type of pump: Plunger Diaphragm Screwlift
 Centrifugal Progressing cavity Other: See comments
4. Mode of operation: Manual Automatic Other:
5. Sludge volume pumped: Not recorded. The facility is adding a meter.
6. Alarm system for equipment failures or overloads operational? Yes No* N/A
7. General condition: Good Fair Poor*

Comments: All pumps were operational. Each GBT is equipped with a sludge grinder pump, feed (lobe) pump, process water (centrifugal) pump, polymer feed (progressive cavity) pump, thickened sludge (progressive cavity).

UNIT PROCESS: Anaerobic Digestion

1. Number of units: 5
 Number of units in operation: 2 primary online- will have 4 primary and one big secondary when renovations are complete
2. Type of sludge digested: Primary and WAS (WAS from GBT)
3. Type of digester: Primary High Rate
 Secondary Standard Rate
4. Frequency of sludge application to digesters: Not currently metered.
5. Number of recirculation pumps: Not determined- currently under construction.
 Number in operation: Not determined.
6. Sludge retention time: over 30 days
7. Provisions for pH adjustment? Yes No
 pH adjustment utilized? Yes No N/A
8. Location of supernatant return: Head Primary Other: Flow Equalization Basins
9. Gas production rate: Not measured, but will have capability in the future.
10. Process control testing: (Average values for May-June 2010)
 a. reduction of volatile solids: Yes No 56%
 b. volatile acids: Yes No 345 mg/L
 c. pH: Yes No N/A see comments.
 d. temperature: Yes No 98 °F
 e. alkalinity: Yes No 2500 mg/L
 f. V/A ratio: Yes No 0.14
 g. volatiles: Yes No 59% VS
11. Signs of overloading? Yes* No
12. General condition: Good Fair Poor*

Comments: Lime slurry may be added for pH adjustment. The facility now monitors alkalinity instead of pH. The renovation plans include the installation of drum screens to reduce the amount of debris going to the digesters. The facility can set the temperature of the digester from a probe in the tank. The transfer pumps allow the facility to feed thickened (GBT) sludge and primary sludge independently.

UNIT PROCESS: Pressure Filtration (Sludge)**(Belt Press)**

1. Number of units: 3
Number In operation: 3
2. Percent solids in influent sludge: primary digester ~ 3.0% (May-June 2010 avg.)
3. Percent solids in discharge cake: ~18 % (May-June 2010 avg.)
4. Filter run time: 6-7 days/week for 8 hrs. each day
5. Amount cake produced: 68 wet tons/day (5 day avg.)
6. Conditioning chemicals used: Yes No
Type and Dose: Polydyne C-3289; 0.005 concentration at 145 gal/hour
7. Sludge pumping: Manual Automatic
8. Recirculating system included on acid wash: Yes No N/A
9. Signs of overloads? Yes * No
10. General condition: Good Fair Poor*

Comments: A holding tank precedes this unit. Pressed sludge is stored at the concrete lined and curbed Sludge Holding Pad. Sludge feed to press's: 370 gpm each 6-7 days/week. Sludge is land applied under contract to Nutra Blend.

UNIT PROCESS: Flow Equalization

1. Type of unit: In-line Side-line Spill Pond
 Number of cells: 2
 Number of cells in operation: 2
2. What unit process does it precede? Flow pumped to Junction Box No. 6
3. Is volume adequate? Yes No
4. Type of mixing: None Diffused air Fixed Mechanical
 Floating mechanical
5. Condition of mixing equipment: Good Average Poor*
6. How drawn off?
 a. Pumped from: Surface Sub-surface Adjustable N/A
 b. Weir: Surface Sub-surface N/A
7. What is the condition of the containment structure? Good Fair Poor*
8. Are the facilities to flush solids and grease from basin walls adequate? Yes No* N/A
9. Are there facilities for withdrawing floating material and foam? Yes No
10. How are solids removed? Drain down Drag line
 Other:
 Is it adequate? Yes No*
11. Is the emergency overflow in good condition? Yes No* N/A
12. Are the depth gauges in good condition? Yes No N/A
13. General condition: Good Fair Poor*

Comments: Two former aeration basins maintained as Flow Equalization Basins. These basins receive tertiary filter backwash, DAF underflow, sludge press filtrate, sludge pad drainage, and digester decant. Diffused air provided by two dedicated blowers.

UNIT PROCESS: Filtration (Tertiary)

1. Type of filters: Gravity Pressure Intermittent
2. Number of units: 9 single media
Number in operation: 8; (#2 out for service)
3. Operation of system: Automatic Semi-automatic
 Manual Other (specify):
4. Proper flow distribution between units? Yes No* N/A
5. Evidence of following problems:
 a. uneven flow distribution? Yes* No N/A
 b. filter clogging (ponding)? Yes* No N/A
 c. nozzles clogging? Yes* No N/A
 d. icing? Yes* No N/A
 e. filter flies? Yes* No N/A
 f. vegetation on filter? Yes* No N/A
6. Filter aid system provided?
Properly operating? Yes No
Chemical used: chlorine if needed
7. Automatic valves properly operating? Yes No* N/A
8. Valves sequencing correctly? Yes No* N/A
9. Backwash system operating properly? Yes No* N/A
10. Filter building adequately ventilated? Yes No* N/A
11. Effluent characteristics: NA
12. General condition: Good* Fair Poor*

Comments: Automatic backwash dependent on head pressure. Three dedicated blowers and two backwash pumps are maintained. Backwash water is discharged to the Equalization Basins.

UNIT PROCESS: Chlorination

1. Number of chlorinators: 2
Number in operation: 1
2. Number of evaporators: 0
Number in operation: 0
3. Number of chlorine contact tanks: 3 tanks w/ 2 chambers each
Number in operation: 4 of 6 chambers
4. Proper flow distribution between units? Yes No * N/A
5. How is chlorine introduced into the wastewater?
 Perforated diffusers
 Injector with single entry point
 Other 12.5% hypochlorite solution feed
6. Chlorine residual in basin effluent: Not checked mg/L
7. Applied chlorine dosage: 900 lbs./day (24 hour average); varies with flow
8. Contact basins adequately baffled? Yes No * N/A
9. Adequate ventilation in:
 a. cylinder storage area? Yes No * N/A
 b. equipment room? Yes No * N/A
10. Proper safety precautions used? Yes No *
11. General condition: Good Fair Poor*

Comments: Sodium hypochlorite solution feed rate is usually flow paced. Six non-potable water feed pumps are maintained, 3 are in use.

UNIT PROCESS: Flow Measurement

Influent Intermediate Effluent

1. Type measuring device: 2 Parshall Flumes and ultrasonic sensors in parallel (Flumes A & B); Flume A and Flume B were on line
2. Present reading: Not viewed
3. Bypass channel? Yes No
Metered? Yes No* N/A
4. Return flows discharged upstream from meter? Yes No
If Yes, identify: N/A
5. Device operating properly? Yes No*
6. Date of last calibration: 8/5/09
7. Evidence of following problems:
 - a. Obstructions? Yes* No
 - b. Grease? Yes* No
8. General condition: Good Fair Poor*

Comments: Totalizer, indicator, and recorder are maintained at each flume. Each flume is reportedly capable of handling 30 MGD.

UNIT PROCESS: Dechlorination

1. Chemical used: Sulfur Dioxide Bisulfite Other
2. Number of sulfonators: 0
Number in operation: 0
3. Number of evaporators: 0
Number in operation: 0
4. Number of chemical feeders: 2
Number in operation: 1
5. Number of contact tanks: 0
Number in operation: 0
6. Proper flow distribution between units? Yes No * N/A
7. How is chemical introduced? Perforated diffusers
 Injector with single entry point
 Other
8. Control system operational?
 a. Residual analyzers? Yes No * N/A
 b. System adjusted: Automatic Manual Other:
9. Applied dechlorinating dose: 1000 lbs./day (7 day average)
10. Chlorine residual in basin effluent: ND mg/L
11. Contact basins adequately baffled? Yes No * N/A
12. Adequate ventilation in:
 a. Chemical storage area? Yes No *
 b. Equipment room? Yes No *
13. Proper safety precautions used? Yes No *
14. General condition: Good Fair Poor*

Comments: Chemical feed rate is flow-paced to maintain a desired effect (preset by operator). The solution is fed to the junction box immediately preceding post aeration. The facility is exploring the idea of moving dechlorination to provide better mixing.

UNIT PROCESS: Post Aeration

1. Number of units: 2
 Number of units in operation: 2
2. Proper flow distribution between units? Yes No N/A
3. Evidence of following problems:
- a. Dead spots? Yes No
 - b. Excessive foam? Yes No
 - c. Poor aeration? Yes No
 - d. Mechanical equipment failure? Yes No N/A
4. How is the aerator controlled? Time clock Manual Continuous
 Other _____ N/A
5. What is the current operating schedule? continuous - step cascade
6. Step weirs level? Yes No N/A
7. Effluent D.O. level: 6/14/10 (1300 hours): 8.4 mg/L @ 23°C
8. General condition: Good Fair Poor*

Comments: Good aeration, some foam post aeration.

UNIT PROCESS: Effluent/Plant Outfall

1. Type outfall: Shore based Submerged
2. Type if shore based: Wingwall Headwall Rip Rap N/A
3. Flapper valve? Yes No
4. Erosion of bank? Yes* No N/A
5. Effluent plume visible? Yes * No
6. Condition of outfall and supporting structures: Good Fair Poor *
7. Final effluent, evidence of following problems:
- a. Oil sheen? Yes* No
 - b. Grease? Yes* No
 - c. Sludge bar? Yes* No
 - d. Turbid effluent? Yes* No
 - e. Visible foam? Yes* No
 - f. Unusual odor? Yes* No

Comments: Water appeared clear at post aeration. The DEQ permit staff and the plant manager were escorted by Dominion Power staff to the Proctors Creek outfall (on Dominion Power property). Permit writers reported no environmental impacts were noted.

CC:

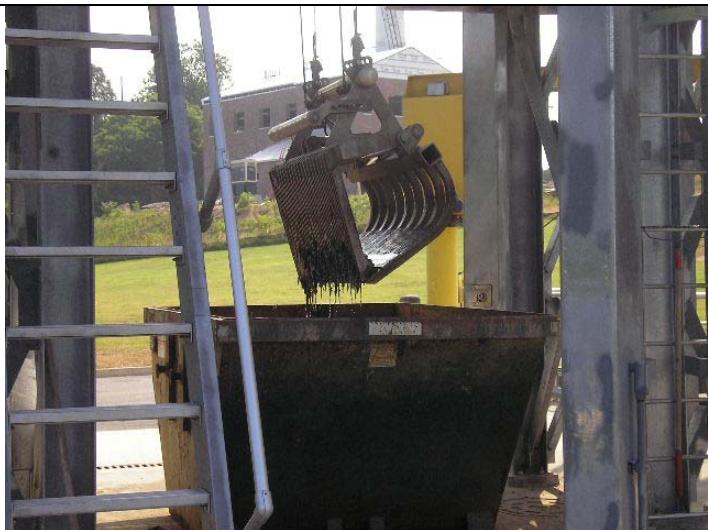
- Owner: c/o of Scott Smedley
- Operator: Terry Cheatham
- Local Health Department:
- VDH Engineering Field Office:
- DEQ - OWCP, attn: Steve Stell
- DEQ - Regional Office File
- EPA - Region III (via DEQ-OWPS)



Photograph 1: Main lift station



Photograph 2: Boscker screen



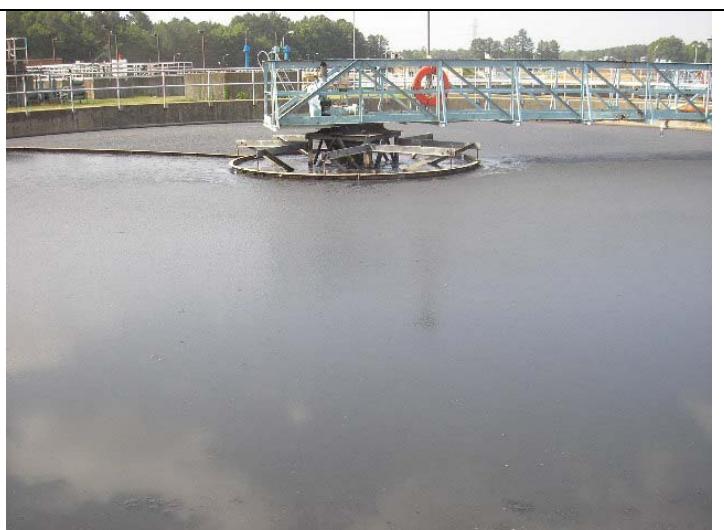
Photograph 3: Boscker screen dropping screenings in dumpster



Photograph 4: Fine screen building under construction



Photograph 5: Drum screens



Photograph 6: Primary clarifier



Photograph 7: Primary clarifier weirs



Photograph 8: Grit removal



Photograph 9: Aeration tank #5 (under construction)



Photograph 10: Aeration tank #6 (aerated zone)



Photograph 11: Aeration basin distribution box



Photograph 12: Secondary clarifier #6



Photograph 13: Algae on secondary clarifier weirs (clarifier #5)



Photograph 14: Intermediate well for primary sludge before digester



Photograph 15: Gravity belt thickener (#3)



Photograph 16: Boilers for digester



Photograph 17: #1 primary digester



Photograph 18: Sludge pumps



Photograph 19: Sludge belt press



Photograph 20: Tertiary filter (#2 down for service)



Photograph 21: EQ basins



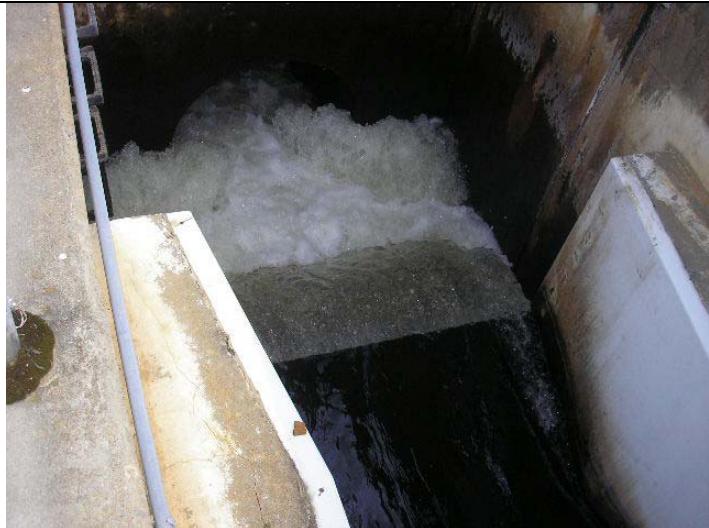
Photograph 22: Chlorine contact tank (CCT)



Photograph 23: Effluent from CCT



Photograph 24: Dechlorination



Photograph 25: Parshall flume



Photograph 26: Step cascade post aeration



Photograph 27: Outfall structure to James River



Photograph 28: James River at the outfall (minor foam quickly dissipated)

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Attachment E

Effluent Data

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Data Submitted with the Application

Proctors Creek Plant -2008

Final Effluent Temperatures (°C) for Year 2008

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	16	15	15	17	18	22	23	25	24	24	20	17
2	15	14	14	17	20	21	24	26	24	24	20	17
3	14	14	15	16	19	21	25	26	24	23	20	17
4	14	15	16	17	19	22	25	25	24	22	20	17
5	15	16	16	16	19	22	23	25	24	23	20	17
6	16	16	16	16	19	22	24	25	25	23	20	16
7	16	15	14	16	19	23	24	25	26	22	20	18
8	17	15	14	16	19	23	27	26	25	22	20	15
9	17	15	15	17	20	23	23	25	25	23	20	16
10	16	15	14	17	19	24	24	25	24	22	19	17
11	17	12	15	18	18	24	24	24	24	23	19	17
12	16	13	15	18	18	24	24	24	25	22	19	15
13	15	14	16	18	18	23	27	24	26	22	19	13
14	15	14	16	17	19	24	23	25	25	23	19	15
15	15	14	16	17	19	24	24	25	25	23	20	16
16	15	15	16	18	20	24	24	25	24	23	19	16
17	15	16	15	18	19	24	24	25	24	22	18	16
18	15	16	14	17	19	23	24	25	24	21	18	16
19	14	14	16	19	19	22	25	25	24	21	17	16
20	14	14	16	18	19	23	24	25	23	21	17	16
21	14	14	15	18	19	24	25	24	23	21	17	16
22	14	14	16	18	19	23	25	24	23	20	17	15
23	15	13	15	18	20	23	25	24	23	20	17	15
24	14	13	15	18	20	23	24	25	23	20	17	15
25	14	14	15	18	20	23	25	25	22	21	17	16
26	14	15	15	19	20	24	25	25	23	21	16	18
27	14	14	17	18	20	24	25	25	23	20	16	16
28	14	14	17	18	20	25	24	24	23	19	17	17
29	14	14	16	18	20	25	25	25	24	19	17	16
30	14		15	18	21	23	25	25	23	19	17	16
31	15		15		21		25	25		19		15
Minimum	14	12	14	16	18	21	23	24	22	19	16	13
Maximum	17	16	17	19	21	25	27	26	26	24	20	18

Maximum Daily Value Nov-May = 21

Maximum Daily Value Jun-Oct = 27

Average Daily Value Nov-May = 17

Average Daily Value Jun-Oct = 24

90th% = 25

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WATER QUALITY CRITERIA MONITORING

CASRN#	CHEMICAL	QUANTIFICATION LEVEL	REPORTING RESULTS
METALS			
7440-36-0	Antimony, dissolved	1.2E5	<5
7440-38-2	Arsenic, dissolved	150	<5
7440-43-9	Cadmium, dissolved	1.4	<0.5
16065-83-1	Chromium III, dissolved	220	<3
18540-29-9	Chromium VI, dissolved	7.1	<3
7440-50-8	Copper, dissolved	5.1	<5
7439-92-1	Lead, dissolved	39	<5
7439-97-6	Mercury, dissolved	0.62	<0.2
7440-02-0	Nickel, dissolved	69	<5
7782-49-2	Selenium, Total Recoverable	8.9	<5
7440-22-4	Silver, dissolved	1.1	<1
7440-28-0	Thallium, dissolved	n/a	<5
7440-66-6	Zinc, dissolved	45	23
PESTICIDES/PCB'S			
309-00-2	Aldrin	0.05	<0.05
57-74-9	Chlordane	0.2	<0.2
2921-88-2	Chlorpyrifos (synonym = Dursban)	n/a	<0.2
72-54-8	DDD	0.1	<0.05
72-55-9	DDE	0.1	<0.05
50-29-3	DDT	0.1	<0.05
8065-48-3	Demeton	n/a	<1
333-41-5	Diazinon	n/a	<1
60-57-1	Dieldrin	0.1	<0.05
959-98-8	Alpha-Endosulfan	0.1	<0.05
33213-65-9	Beta-Endosulfan	0.1	<0.05
1031-07-8	Endosulfan Sulfate	0.1	<0.05
72-20-8	Endrin	0.1	<0.05

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7421-93-4	Endrin Aldehyde	n/a	<0.05
86-50-0	Guthion	n/a	<1
76-44-8	Heptachlor	0.05	<0.05
1024-57-3	Heptachlor Epoxide	n/a	<0.05
319-84-6	Hexachlorocyclohexane Alpha-BHC	n/a	<0.05
319-85-7	Hexachlorocyclohexane Beta-BHC	n/a	<0.05
58-89-9	Hexachlorocyclohexane Gamma-BHC or Lindane	n/a	<0.05
143-50-0	Kepone	n/a	<5
121-75-5	Malathion	n/a	<1
72-43-5	Methoxychlor	n/a	<0.05
2385-85-5	Mirex	n/a	<0.05
56-38-2	Parathion	n/a	<1
1336-36-3	PCB Total	7.0	<0.5
8001-35-2	Toxaphene	5.0	<0.5
BASE NEUTRAL EXTRACTABLES			
83-32-9	Acenaphthene	10.0	<5
120-12-7	Anthracene	10.0	<5
92-87-5	Benzidine	n/a	<5
56-55-3	Benzo (a) anthracene	10.0	<5
205-99-2	Benzo (b) fluoranthene (3,4-benzofluoranthene)	10.0	<5
207-08-9	Benzo (k) fluoranthene	10.0	<5
50-32-8	Benzo (a) pyrene	10.0	<5
111-44-4	Bis 2-Chloroethyl Ether	n/a	<5
108-60-1	Bis 2-Chloroisopropyl Ether	n/a	<5
85-68-7	Butyl benzyl phthalate	10.0	<5
91-58-7	2-Chloronaphthalene	n/a	<5
218-01-9	Chrysene	10.0	<5
53-70-3	Dibenz(a,h)anthracene	20.0	<5
84-74-2	Dibutyl phthalate (synonym = Di-n-Butyl Phthalate)	10.0	<5
95-50-1	1,2-Dichlorobenzene	10.0	<5

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541-73-1	1,3-Dichlorobenzene	10.0	<5
106-46-7	1,4-Dichlorobenzene	10.0	<5
91-94-1	3,3-Dichlorobenzidine	n/a	<5
84-66-2	Diethyl phthalate	10.0	<5
117-81-7	Bis-2-ethylhexyl phthalate	10.0	<5, 15, 32
131-11-3	Dimethyl phthalate	n/a	<5
121-14-2	2,4-Dinitrotoluene	10.0	<5
122-66-7	1,2-Diphenylhydrazine	n/a	<5
206-44-0	Fluoranthene	10.0	<5
86-73-7	Fluorene	10.0	<5
118-74-1	Hexachlorobenzene	n/a	<5
87-68-3	Hexachlorobutadiene	n/a	<5
77-47-4	Hexachlorocyclopentadiene	n/a	<5
67-72-1	Hexachloroethane	n/a	<5
193-39-5	Indeno(1,2,3-cd)pyrene	20.0	<5
78-59-1	Isophorone	10.0	<5
98-95-3	Nitrobenzene	10.0	<5
62-75-9	N-Nitrosodimethylamine	n/a	<5
621-64-7	N-Nitrosodi-n-propylamine	n/a	<5
86-30-6	N-Nitrosodiphenylamine	n/a	<5
129-00-0	Pyrene	10.0	<5
120-82-1	1,2,4-Trichlorobenzene	10.0	<5
VOLATILES			
107-02-8	Acrolein	n/a	<50
107-13-1	Acrylonitrile	n/a	<50
71-43-2	Benzene	10.0	<5
75-25-2	Bromoform	10.0	<5
56-23-5	Carbon Tetrachloride	10.0	<5
108-90-7	Chlorobenzene (synonym = monochlorobenzene)	50.0	<5
124-48-1	Chlorodibromomethane	10.0	<5

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Proctors Creek WWTP

67-66-3	Chloroform	10.0	<5, 20, 10
75-09-2	Dichloromethane (synonym = methylene chloride)	20.0	<5
75-27-4	Dichlorobromomethane	10.0	<5, 10, <5
107-06-2	1,2-Dichloroethane	10.0	<5
75-35-4	1,1-Dichloroethylene	10.0	<5
156-60-5	1,2-trans-dichloroethylene	n/a	<5
78-87-5	1,2-Dichloropropane	n/a	<5
542-75-6	1,3-Dichloropropene	n/a	<5
100-41-4	Ethylbenzene	10.0	<5
74-83-9	Methyl Bromide	n/a	<10
79-34-5	1,1,2,2-Tetrachloroethane	n/a	<5
127-18-4	Tetrachloroethylene	10.0	<5
10-88-3	Toluene	10.0	<5
79-00-5	1,1,2-Trichloroethane	n/a	<5
79-01-6	Trichloroethylene	10.0	<5
75-01-4	Vinyl Chloride	10.0	<10
RADIONUCLIDES			
	Uranium	n/a	<0.6 pCi/L
	Radium 226	n/a	0.5 pCi/L
	Radium 228	n/a	<1.1 pCi/L
	Beta Particle & Photon Activity (mrem/yr)	n/a	10.3 pCi/L
	Gross Alpha Particle Activity	n/a	<1.3 pCi/L
ACID EXTRACTABLES			
95-57-8	2-Chlorophenol	10.0	<5
120-83-2	2,4 Dichlorophenol	10.0	<5
105-67-9	2,4 Dimethylphenol	10.0	<5
51-28-5	2,4-Dinitrophenol	n/a	<20
534-52-1	2-Methyl-4,6-Dinitrophenol (4,6-dinitro-o-creosol)	n/a	<5
25154-52-3	Nonylphenol	n/a	<5
87-86-5	Pentachlorophenol	50.0	<10

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108-95-2	Phenol	10.0	<5
88-06-2	2,4,6-Trichlorophenol	10.0	<5
MISCELLANEOUS			
776-41-7	Ammonia as NH3-N	200	See DMR Data
16887-00-6	Chlorides	n/a	70 mg/L
7782-50-5	Chlorine, Total Residual	100	See DMR Data
57-12-5	Cyanide, Free	10.0	<5
N/A	<i>E. coli / Enterococcus</i> (N/CML)	n/a	See DMR data
7783-06-4	Hydrogen Sulfide	n/a	270, <200, 4, <5, <3, <3
60-10-5	Tributyltin	n/a	<0.04
	Hardness (mg/L as CaCO ₃)	n/a	228, 171, 172

Parameter	Maximum Daily Value		Average Daily Value		
	Value	Units	Value	Units	No. Samples
pH (minimum)	6.3	S.U.			
pH (maximum)	7.9	S.U.			
Flow Rate	19.31	MGD	15.51	MGD	continuous
Temperature (Winter)	21	°C	17	°C	366
Temperature (Summer)	27	°C	22	°C	366

Pollutant	Maximum Daily Discharge		Average Daily Discharge		
	Conc.	Units	Conc.	Units	No. Samples
cBOD ₅	10	mg/L	<5	mg/L	122
Fecal Coliform	39	N/100 mL	4	N/100 mL	125
TSS	107	mg/L	3.6	mg/L	251

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Data Submitted during the 2005-2010 Permit Cycle

DMR Date	Flow (MGD)	pH (S.U.)	pH (S.U.)	TSS (mg/L)	DO (mg/L)	Ammonia (mg/L)	cBOD5 (mg/L)	TP (mg/L)
10-Feb-07	18.3	6.8	7.9	2.7	8.9	<0.1	<QL	1.1
10-Mar-07	17.1	7	7.9	3.2	9.3	0.4	<QL	1.4
10-Apr-07	15.9	7.1	7.9	4.4	9.5	0.1	<QL	0.5
10-May-07	12.81	7	7.9	18.5	8.6	1.97	0.5	1.17
10-Jun-07	14.45	6.9	7.9	2.1	8.1	0.77	<QL	1.08
10-Jul-07	15.94	7	7.8	2.5	7.8	0.29	<QL	1.19
10-Aug-07	14.36	6.8	7.9	2	7.5	0	<QL	1.74
10-Sep-07	15.43	7.1	7.9	2.7	7.7	0.48	<QL	1.52
10-Oct-07	13.56	7	8	2.1	8.1	0.61	<QL	0.99
10-Nov-07	14.43	6.8	7.8	2.7	6.7	0.3	<QL	1.62
10-Dec-07	14.34	6.8	7.7	3.6	7.2	0.54	<QL	1.1
10-Jan-08	13.37	6.8	7.8	4.6	9.1	1.9	<QL	0.38
10-Feb-08	13.08	6.9	7.8	4.5	9.2	4.38	<QL	0.78
10-Mar-08	14.21	6.8	7.7	2.5	6.9	2.19	<QL	1.26
10-Apr-08	15.83	6.7	7.6	2.2	9.2	0.26	<QL	1.3
10-May-08	19.31	6.3	7.8	9.6	9	0.17	0.7	0.72
10-Jun-08	18.27	6.8	7.6	4.3	8.6	<QL	<QL	0.54
10-Jul-08	14.25	6.8	7.8	2.3	7.8	0.26	<QL	1.06
10-Aug-08	13.64	6.4	7.8	1.9	7.8	0.07	<QL	1.78
10-Sep-08	14.03	6.9	7.9	1.4	7.6	<QL	<QL	1.77
10-Oct-08	16.17	7	7.8	1.8	7.9	0.06	<QL	1.21
10-Nov-08	14.55	6.9	7.8	2.8	8.3	<QL	<QL	1.58
10-Dec-08	15.15	6.4	7.6	2.7	8.8	0.1	<QL	1.24
10-Jan-09	17.61	6.5	7.9	7.5	9.4	0.25	<QL	1.36
10-Feb-09	15.34	6.3	7.5	5.7	9.3	0.52	1.2	1.33
10-Mar-09	14.14	5.9	8.1	5.3	9.8	1.14	<QL	1.39
10-Apr-09	17.85	6.2	7.3	6.6	9.5	1.04	0.78	1.29
10-May-09	15.95	6.4	7.3	17.1	9.1	0.54	2.1	1.22
10-Jun-09	16.93	6.4	7.4	5.3	8.5	<QL	0.9	0.88
10-Jul-09	15.04	6.4	7	3	8.1	0.03	<QL	1.18
10-Aug-09	13.53	6.5	7.4	1.2	8	<QL	<QL	1.9
10-Sep-09	13.44	6.6	7.3	1.6	7.7	0.02	<QL	1.32
10-Oct-09	13.94	6.8	7.4	0.1	8.2	<QL	<QL	1.45
10-Nov-09	13.58	6.5	7.3	0.2	8.4	<QL	<QL	1.54
10-Dec-09	19.58	6.4	7.4	0.8	9.1	<QL	<QL	1.22
10-Jan-10	23.38	6.3	7.3	1.2	9.3	0.21	<QL	1.21
Average	15.52	6.67	7.67	7.47	8.44	0.52	0.17	1.23
90th%	18.29	7	7.9	16	9.35	1.52	0.74	1.68
10th%	13.49	6.3	7.3	0.5	7.55	0.00	0.00	0.75

NOTE: <QL values were evaluated as zero in the statistical calculations.

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Hardness Data
from WET Tests & Application

Date	mg/L as CaCO ₃
12-Sep-05	180
14-Sep-05	170
16-Sep-05	209
19-Jun-06	106
22-Jun-06	95
24-Jun-06	160
4-Jun-07	214
7-Jun-07	122
9-Jun-07	154
13-Nov-07	228
16-Jun-08	231
19-Jun-08	210
21-Jun-08	160
25-Jun-08	172
10-Feb-09	171
28-Jul-09	74
30-Jul-09	82
1-Aug-09	73
Average	156

Fact Sheet
Proctors Creek WWTP

Attachment F

Effluent Limitation Analysis

2005 Flow Modeling Information

Adjusted Flows Illustrating Richmond and Henrico Water Treatment Plants (WTPs) Withdrawals and the Richmond Wastewater Treatment Plant Discharge

Adjusted Flow = Unadulterated Flow – Withdrawals + Discharges

Ex. Adjusted Flow = 506 MGD – 128 MGD Richmond WTP + 48 MGD Richmond WWTP
= 426 MGD

Flow Type	Flow	Adjusted Flow
Low Flows		
1Q10	506	426
7Q10	579	499
30Q10	716	636
30Q5	784	704
High Flows		
1Q10	1160	1080
7Q10	1392	1312
30Q10	1742	1662
HM	2268	2188

Note: While the Henrico Water Treatment Plant is now online, it has contracted the Richmond Water Treatment Plant to provide some water supplies for the next 10 years. Per a conversation with Allan Brockenbraugh, the Henrico WTP's withdrawals from the James River are expected to be negligible over this permit cycle. Therefore, only the Richmond WTP withdrawal will be considered in conjunction with the Richmond Wastewater Treatment Plant discharge with respect to the projected flows at the Proctor's Creek outfall.

Low flows are from June – December while high flows are from January – May.

2005 Flow Modeling Information

Mixing Zone Predictions for Proctor's Creek WWTP

Effluent Flow = 27 MGD
Stream 7Q10 = 499 MGD
Stream 30Q10 = 636 MGD
Stream 1Q10 = 426 MGD
Stream slope = 0.00038 ft/ft
Stream width = 700 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 2.4411 ft
Length = 221370.33 ft
Velocity = .4765 ft/sec
Residence Time = 5.377 days

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 37.2% of the 7Q10 is used.

Mixing Zone Predictions @ 30Q10

Depth = 2.806 ft
Length = 196972.36 ft
Velocity = .5225 ft/sec
Residence Time = 4.3631 days

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 45.84% of the 30Q10 is used.

Mixing Zone Predictions @ 1Q10

Depth = 2.2313 ft
Length = 238682.59 ft
Velocity = .449 ft/sec
Residence Time = 147.674 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than .68% of the 1Q10 is used.

Fact Sheet
Proctors Creek WWTP

Source of MSTRANTI Input Data

Stream Information:	
Stream Flows	Tidal Default Ratios
Mean Hardness	
90% Temperature	Ambient Monitoring Station data
90% Maximum pH	(Attachment C)
10% Maximum pH	
Tier Designation	Flow Frequency Memorandum (Attachment C)
Mixing Information for MSTRANTI	
All Data	100% is used with Tidal Default Ratios
Effluent Information	
Mean Hardness	Application Effluent Data (Attachment E)
90% Temperature	Application Effluent Data (Attachment E)
90% Maximum pH	DMR Data (See Attachment E)
10% Maximum pH	
Discharge Flow	Design Flow

2010 MSTRANTI

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Proctors Creek WWTP

Permit No.: VA0024996

Receiving Stream: James River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO3) =	66.4 mg/L	1Q10 (Annual) =	27 MGD	Annual - 1Q10 Mix =	100 %	Mean Hardness (as CaCO3) =	156 mg/L
90% Temperature (Annual) =	29.1 deg C	7Q10 (Annual) =	1323 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	25 deg C
90% Temperature (Wet season) =	deg C	30Q10 (Annual) =	1323 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	deg C
90% Maximum pH =	7.9 SU	1Q10 (Wet season) =	MGD	Wet Season - 1Q10 Mix =	%	90% Maximum pH =	7.9 SU
10% Maximum pH =	7.1 SU	30Q10 (Wet season) =	MGD	- 30Q10 Mix =	%	10% Maximum pH =	7.3 SU
Tier Designation (1 or 2) =	1	30Q5 =	1323 MGD			Discharge Flow =	27 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	1323 MGD				
Trout Present Y/N? =	n						
Early Life Stages Present Y/N? =	y						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	5.0E+04	--	--	--	--	--	--	--	--	--	--	na	5.0E+04
Acrolein	0	--	--	na	9.3E+00	--	--	na	4.7E+02	--	--	--	--	--	--	--	--	--	--	na	4.7E+02
Acrylonitrile ^c	0	--	--	na	2.5E+00	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	--	--	na	1.3E+02
Aldrin ^c	0	3.0E+00	--	na	5.0E-04	6.0E+00	--	na	2.5E-02	--	--	--	--	--	--	--	--	6.0E+00	--	na	2.5E-02
Ammonia-N (mg/l) (Yearly)	0	1.01E+01	1.10E+00	na	--	2.0E+01	5.5E+01	na	--	--	--	--	--	--	--	--	--	2.0E+01	5.5E+01	na	--
Ammonia-N (mg/l) (High Flow)	0	1.01E+01	2.80E+00	na	--	1.0E+01	2.8E+00	na	--	--	--	--	--	--	--	--	--	1.0E+01	2.8E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	2.0E+06	--	--	--	--	--	--	--	--	--	--	na	2.0E+06
Antimony	0	--	--	na	6.4E+02	--	--	na	3.2E+04	--	--	--	--	--	--	--	--	--	--	na	3.2E+04
Arsenic	0	3.4E+02	1.5E+02	na	--	6.8E+02	7.5E+03	na	--	--	--	--	--	--	--	--	--	6.8E+02	7.5E+03	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene ^c	0	--	--	na	5.1E+02	--	--	na	2.6E+04	--	--	--	--	--	--	--	--	--	--	na	2.6E+04
Benzidine ^c	0	--	--	na	2.0E-03	--	--	na	1.0E-01	--	--	--	--	--	--	--	--	--	--	na	1.0E-01
Benzo (a) anthracene ^c	0	--	--	na	1.8E-01	--	--	na	9.0E+00	--	--	--	--	--	--	--	--	--	--	na	9.0E+00
Benzo (b) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	9.0E+00	--	--	--	--	--	--	--	--	--	--	na	9.0E+00
Benzo (k) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	9.0E+00	--	--	--	--	--	--	--	--	--	--	na	9.0E+00
Benzo (a) pyrene ^c	0	--	--	na	1.8E-01	--	--	na	9.0E+00	--	--	--	--	--	--	--	--	--	--	na	9.0E+00
Bis2-Chloroethyl Ether ^c	0	--	--	na	5.3E+00	--	--	na	2.7E+02	--	--	--	--	--	--	--	--	--	--	na	2.7E+02
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	3.3E+06	--	--	--	--	--	--	--	--	--	--	na	3.3E+06
Bis 2-Ethylhexyl Phthalate ^c	0	--	--	na	2.2E+01	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	--	--	na	1.1E+03
Bromoform ^c	0	--	--	na	1.4E+03	--	--	na	7.0E+04	--	--	--	--	--	--	--	--	--	--	na	7.0E+04
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	9.5E+04	--	--	--	--	--	--	--	--	--	--	na	9.5E+04
Cadmium	0	4.4E+00	8.4E-01	na	--	8.8E+00	4.2E+01	na	--	--	--	--	--	--	--	--	--	8.8E+00	4.2E+01	na	--
Carbon Tetrachloride ^c	0	--	--	na	1.6E+01	--	--	na	8.0E+02	--	--	--	--	--	--	--	--	--	--	na	8.0E+02
Chlordane ^c	0	2.4E+00	4.3E-03	na	8.1E-03	4.8E+00	2.2E-01	na	4.1E-01	--	--	--	--	--	--	--	--	4.8E+00	2.2E-01	na	4.1E-01
Chloride	0	8.6E+05	2.3E+05	na	--	1.7E+06	1.2E+07	na	--	--	--	--	--	--	--	--	--	1.7E+06	1.2E+07	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	5.5E+02	na	--	--	--	--	--	--	--	--	--	3.8E+01	5.5E+02	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04

Parameter (ug/l unless noted)	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ^c	0	--	--	na	1.3E+02	--	--	--	na	6.5E+03	--	--	--	--	--	--	--	--	--	--	na	6.5E+03
Chloroform	0	--	--	na	1.1E+04	--	--	--	na	5.5E+05	--	--	--	--	--	--	--	--	--	--	na	5.5E+05
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	--	na	7.5E+03	--	--	--	--	--	--	--	--	--	--	na	7.5E+03
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	2.1E+00	na	--	--	--	--	--	--	--	--	--	--	1.7E-01	2.1E+00	na	--
Chromium III	0	6.2E+02	5.4E+01	na	--	1.2E+03	2.7E+03	na	--	--	--	--	--	--	--	--	--	--	1.2E+03	2.7E+03	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.2E+01	5.5E+02	na	--	--	--	--	--	--	--	--	--	--	3.2E+01	5.5E+02	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene ^c	0	--	--	na	1.8E-02	--	--	na	9.0E-01	--	--	--	--	--	--	--	--	--	--	--	na	9.0E-01
Copper	0	1.5E+01	6.5E+00	na	--	3.0E+01	3.2E+02	na	--	--	--	--	--	--	--	--	--	--	3.0E+01	3.2E+02	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.4E+01	2.6E+02	na	8.0E+05	--	--	--	--	--	--	--	--	--	4.4E+01	2.6E+02	na	8.0E+05
DDD ^c	0	--	--	na	3.1E-03	--	--	na	1.6E-01	--	--	--	--	--	--	--	--	--	--	--	na	1.6E-01
DDE ^c	0	--	--	na	2.2E-03	--	--	na	1.1E-01	--	--	--	--	--	--	--	--	--	--	--	na	1.1E-01
DDT ^c	0	1.1E+00	1.0E-03	na	2.2E-03	2.2E+00	5.0E-02	na	1.1E-01	--	--	--	--	--	--	--	--	--	2.2E+00	5.0E-02	na	1.1E-01
Demeton	0	--	--	1.0E-01	na	--	--	5.0E+00	na	--	--	--	--	--	--	--	--	--	5.0E+00	na	--	
Diazinon	0	1.7E-01	1.7E-01	na	--	3.4E-01	8.5E+00	na	--	--	--	--	--	--	--	--	--	--	3.4E-01	8.5E+00	na	--
Dibenz(a,h)anthracene ^c	0	--	--	na	1.8E-01	--	--	na	9.0E+00	--	--	--	--	--	--	--	--	--	--	--	na	9.0E+00
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	6.5E+04	--	--	--	--	--	--	--	--	--	--	--	na	6.5E+04
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	4.8E+04	--	--	--	--	--	--	--	--	--	--	--	na	4.8E+04
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	9.5E+03	--	--	--	--	--	--	--	--	--	--	--	na	9.5E+03
3,3-Dichlorobenzidine ^c	0	--	--	na	2.8E-01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	--	--	--	na	1.4E+01
Dichlorobromomethane ^c	0	--	--	na	1.7E+02	--	--	na	8.5E+03	--	--	--	--	--	--	--	--	--	--	--	na	8.5E+03
1,2-Dichloroethane ^c	0	--	--	na	3.7E+02	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	--	na	1.9E+04
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	3.6E+05	--	--	--	--	--	--	--	--	--	--	--	na	3.6E+05
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	5.0E+05	--	--	--	--	--	--	--	--	--	--	--	na	5.0E+05
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	--	--	na	1.5E+04
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane ^c	0	--	--	na	1.5E+02	--	--	na	7.5E+03	--	--	--	--	--	--	--	--	--	--	--	na	7.5E+03
1,3-Dichloropropene ^c	0	--	--	na	2.1E+02	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Dielein ^c	0	2.4E-01	5.6E-02	na	5.4E-04	4.8E-01	2.8E+00	na	2.7E-02	--	--	--	--	--	--	--	--	--	4.8E-01	2.8E+00	na	2.7E-02
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	4.3E+04	--	--	--	--	--	--	--	--	--	--	--	na	4.3E+04
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	5.5E+07	--	--	--	--	--	--	--	--	--	--	--	na	5.5E+07
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	2.3E+05	--	--	--	--	--	--	--	--	--	--	--	na	2.3E+05
2,4-Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	2.7E+05	--	--	--	--	--	--	--	--	--	--	--	na	2.7E+05
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
2,4-Dinitrotoluene ^c	0	--	--	na	3.4E+01	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dioxin 2,3,7,8-tetrachlorobenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	2.6E-06	--	--	--	--	--	--	--	--	--	--	--	na	2.6E-06
1,2-Diphenylhydrazine ^c	0	--	--	na	2.0E+00	--	--	na	1.0E+02	--	--	--	--	--	--	--	--	--	--	--	na	1.0E+02
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	2.8E+00	na	4.5E+03	--	--	--	--	--	--	--	--	--	4.4E-01	2.8E+00	na	4.5E+03
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	2.8E+00	na	4.5E+03	--	--	--	--	--	--	--	--	--	4.4E-01	2.8E+00	na	4.5E+03
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	2.8E+00	--	--	--	--	--	--	--	--	--	--	--	4.4E-01	2.8E+00	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	4.5E+03	--	--	--	--	--	--	--	--	--	--	--	na	4.5E+03
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.7E-01	1.8E+00	na	3.0E+00	--	--	--	--	--	--	--	--	1.7E-01	1.8E+00	na	3.0E+00	
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	1.5E+01	--	--	--	--	--	--	--	--	--	--	--	na	1.5E+01

Parameter (ug/l unless noted)	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	--	na	1.1E+05
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	7.0E+03	--	--	--	--	--	--	--	--	--	--	--	na	7.0E+03
Fluorene	0	--	--	na	5.3E+03	--	--	na	2.7E+05	--	--	--	--	--	--	--	--	--	--	--	na	2.7E+05
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Guthion	0	--	1.0E-02	na	--	--	5.0E-01	na	--	--	--	--	--	--	--	--	--	--	5.0E-01	na	--	
Heptachlor C	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	1.9E-01	na	4.0E-02	--	--	--	--	--	--	--	--	1.0E+00	1.9E-01	na	4.0E-02	
Heptachlor Epoxide C	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	1.9E-01	na	2.0E-02	--	--	--	--	--	--	--	--	1.0E+00	1.9E-01	na	2.0E-02	
Hexachlorobenzene C	0	--	--	na	2.9E-03	--	--	na	1.5E-01	--	--	--	--	--	--	--	--	--	--	--	na	1.5E-01
Hexachlorobutadiene C	0	--	--	na	1.8E+02	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	--	na	9.0E+03
Hexachlorocyclohexane																						
Alpha-BHC C	0	--	--	na	4.9E-02	--	--	na	2.5E+00	--	--	--	--	--	--	--	--	--	--	--	na	2.5E+00
Hexachlorocyclohexane																						
Beta-BHC C	0	--	--	na	1.7E-01	--	--	na	8.5E+00	--	--	--	--	--	--	--	--	--	--	--	na	8.5E+00
Hexachlorocyclohexane																						
Gamma-BHC C (Lindane)	0	9.5E-01	na	na	1.8E+00	1.9E+00	--	na	9.0E+01	--	--	--	--	--	--	--	--	1.9E+00	--	na	9.0E+01	
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	5.5E+04	--	--	--	--	--	--	--	--	--	--	--	na	5.5E+04
Hexachloroethane C	0	--	--	na	3.3E+01	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	1.0E+02	na	--	--	--	--	--	--	--	--	--	1.0E+02	na	--		
Indeno (1,2,3-cd) pyrene C	0	--	--	na	1.8E-01	--	--	na	9.0E+00	--	--	--	--	--	--	--	--	--	--	--	na	9.0E+00
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone C	0	--	--	na	9.6E+03	--	--	na	4.8E+05	--	--	--	--	--	--	--	--	--	--	--	na	4.8E+05
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	0.0E+00	na	--		
Lead	0	1.4E+02	8.3E+00	na	--	2.7E+02	4.1E+02	na	--	--	--	--	--	--	--	--	--	2.7E+02	4.1E+02	na	--	
Malathion	0	--	1.0E-01	na	--	--	5.0E+00	na	--	--	--	--	--	--	--	--	--	5.0E+00	na	--		
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
Mercury	0	1.4E+00	7.7E-01	--	--	2.8E+00	3.9E+01	--	--	--	--	--	--	--	--	--	--	2.8E+00	3.9E+01	--	--	
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	7.5E+04	--	--	--	--	--	--	--	--	--	--	--	na	7.5E+04
Methylene Chloride C	0	--	--	na	5.9E+03	--	--	na	3.0E+05	--	--	--	--	--	--	--	--	--	--	--	na	3.0E+05
Methoxychlor	0	--	3.0E-02	na	--	--	1.5E+00	na	--	--	--	--	--	--	--	--	--	1.5E+00	na	--		
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	0.0E+00	na	--		
Nickel	0	2.0E+02	1.5E+01	na	4.6E+03	4.0E+02	7.3E+02	na	2.3E+05	--	--	--	--	--	--	--	--	4.0E+02	7.3E+02	na	2.3E+05	
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	3.5E+04	--	--	--	--	--	--	--	--	--	--	--	na	3.5E+04
N-Nitrosodimethylamine C	0	--	--	na	3.0E+01	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	--	--	--	na	1.5E+03
N-Nitrosodiphenylamine C	0	--	--	na	6.0E+01	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
N-Nitrosodi-n-propylamine C	0	--	--	na	5.1E+00	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	--	--	--	na	2.6E+02
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.6E+01	3.3E+02	na	--	--	--	--	--	--	--	--	--	5.6E+01	3.3E+02	na	--	
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	6.5E-01	na	--	--	--	--	--	--	--	--	--	1.3E-01	6.5E-01	na	--	
PCB Total C	0	--	1.4E-02	na	6.4E-04	--	7.0E-01	na	3.2E-02	--	--	--	--	--	--	--	--	--	7.0E-01	na	3.2E-02	
Pentachlorophenol C	0	1.1E+01	7.4E+00	na	3.0E+01	2.1E+01	3.7E+02	na	1.5E+03	--	--	--	--	--	--	--	--	2.1E+01	3.7E+02	na	1.5E+03	
Phenol	0	--	--	na	8.6E+05	--	--	na	4.3E+07	--	--	--	--	--	--	--	--	--	--	--	na	4.3E+07
Pyrene	0	--	--	na	4.0E+03	--	--	na	2.0E+05	--	--	--	--	--	--	--	--	--	--	--	na	2.0E+05
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	2.0E+02	--	--	--	--	--	--	--	--	--	--	--	na	2.0E+02
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	4.0E+01	2.5E+02	na	2.1E+05	--	--	--	--	--	--	--	4.0E+01	2.5E+02	na	2.1E+05	
Silver	0	4.1E+00	--	na	--	8.3E+00	--	na	--	--	--	--	--	--	--	--	8.3E+00	--	na	--	
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	na	--	
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	4.0E+01	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	na	2.0E+03	
Tetrachloroethylene ^C	0	--	--	na	3.3E+01	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	na	1.7E+03	
Thallium	0	--	--	na	4.7E-01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	--	na	2.4E+01	
Toluene	0	--	--	na	6.0E+03	--	--	na	3.0E+05	--	--	--	--	--	--	--	--	--	na	3.0E+05	
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	na	--	
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	1.0E-02	na	1.4E-01	--	--	--	--	--	--	--	1.5E+00	1.0E-02	na	1.4E-01	
Tributyltin	0	4.6E-01	7.2E-02	na	--	9.2E-01	3.6E+00	na	--	--	--	--	--	--	--	--	9.2E-01	3.6E+00	na	--	
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	3.5E+03	--	--	--	--	--	--	--	--	--	na	3.5E+03	
1,1,2-Trichloroethane ^C	0	--	--	na	1.6E+02	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	na	8.0E+03	
Trichloroethylene ^C	0	--	--	na	3.0E+02	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	na	1.5E+04	
2,4,6-Trichlorophenol ^C	0	--	--	na	2.4E+01	--	--	na	1.2E+03	--	--	--	--	--	--	--	--	--	na	1.2E+03	
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	na	--	
Vinyl Chloride ^C	0	--	--	na	2.4E+01	--	--	na	1.2E+03	--	--	--	--	--	--	--	--	--	na	1.2E+03	
Zinc	0	1.3E+02	8.5E+01	na	2.6E+04	2.6E+02	4.3E+03	na	1.3E+06	--	--	--	--	--	--	--	2.6E+02	4.3E+03	na	1.3E+06	

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	3.2E+04
Arsenic	2.7E+02
Barium	na
Cadmium	3.5E+00
Chromium III	5.0E+02
Chromium VI	1.3E+01
Copper	1.2E+01
Iron	na
Lead	1.1E+02
Manganese	na
Mercury	1.1E+00
Nickel	1.6E+02
Selenium	1.6E+01
Silver	3.3E+00
Zinc	1.0E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Cook,Diane

From: Linderman,Curt
Sent: Tuesday, February 04, 2003 12:08 PM
To: Deborah Morgan; Debra Barnes; Denise Mosca; Corwin Chamberlain; Diane Cook; Doris McLeod; Jeffrey Selengut; Jerry Little; Oula Shehab; Ray Jenkins
Subject: FW: QL for Cyanide

fyi

-----Original Message-----

From: Brockenbrough,Allan
Sent: Wednesday, January 29, 2003 3:39 PM
To: Goode,Robert; VanSoestbergen,Jon
Cc: Purcell,Bill; Fahy,Thomas; Fowler,Keith; Foster,Kip; Newman,Allen; Linderman,Curt; McConathy,James
Subject: RE: QL for Cyanide

Bob-

This is a sticky one. I've discussed it at length with Jon and here's what we recommend.....

The introduction of "censored" data (<QL, ND, etc.) into a data set with "uncensored" data (>QL) creates real problems with the statistics. For example, consider the following data sets and how they are handled by the current STATS.EXE software:

Data	Data Type	Expected Value	97 th % of daily values
5, 6	2	5.5	13.4
5, 6, <5	1	7.4	18.1
5, 6, <5, <5	1	5.8	14.2
5, 6, <5, <5, <5	1	5.1	12.3

One would assume that the addition of the <5 in the second data set above would not hurt the permittee's chances of avoiding a limit. However, the change in assumptions made in order to be able to include the censored data does just that (see pp. 57-58 of GM #00-2011 for a discussion of the differences). In the above example, it is not until 3 censored values are obtained (all below the original 2 uncensored values), that the bias in the assumptions for handling Type 1 data is overcome. For this reason, we recommend that all "censored" (<QL) data be handled in essentially the same way that we handle total recoverable metals data - that is, that it should only be used to show that a limit is not necessary.

* In cases where you have data both greater than and less than a QL, STATS should first be run with only the data greater than the QL. If no limit is necessary, then the analysis is complete. If a limit is determined to be necessary, then the "<QL" data should be added to the data set in STATS as follows:

The QL should be set equal to the lesser of (1) the lowest uncensored (>QL) result in the data set or (2) the average of all the QLs that are less than or equal to the lowest uncensored (>QL) result in the data set. Any "<" data at QLs greater than the lowest uncensored (>QL) result in the data set should not be entered in STATS. Examples...

Original Data Set	STATS QL	Data entered in STATS
5, 5, <5, <5, <5, <5, <6, <6	5	5, 5, <5, <5, <5
5, 5, <2, <2, <5, <5, <6, <6	3.8	5, 5, <2, <2, <5, <5, <5
2, <1, <5 , <5, 6, <2, <50	1.5	2, <1, 6, <2
2, 3, <3, <5	2	2, 3
2, 3, <3, <5, <1, <1, <2	1.3	2, 3, <1, <1, <2

If the inclusion of the <QL data still results in an effluent limit, the second analysis with the <QL data should be

12, <5, 9, <5, <1

included in the fact sheet (the limit is necessary in spite of the <QL data if the >QL data alone required a limit).
We hope to study this a bit more and revise the guidance if necessary. If you become aware of any data sets whereby the above advice doesn't seem to make sense, please bring them to our attention.

Allan

-----Original Message-----

From: Goode, Robert
Sent: Tuesday, January 28, 2003 1:33 PM
To: VanSoestbergen, Jon
Cc: Brockenbrough, Allan; Purcell, Bill; Faha, Thomas; Fowler, Keith; Foster, Kip; Newman, Allen; Linderman, Curt; McConathy, James
Subject: QL for Cyanide

Jon - Is there a specific QL we should be using in the STAT.EXE program? We list a QL of 10 ug/l in the WQ monitoring (Attachment A) permit condition. Most of the data being received comes in at <5 or <6 ug/l. I have also seen something which might suggest 2 ug/l.

I have a sewage treatment plant which has a proposed CN limit (based on a QL of 5 ug/l). They have been testing for CN all last year and the results are 2 @ 5 ug/l, 2 @ <6 ug/l and 4 @ <5 ug/l. If we use a QL in STATs of 10, all data are below the QL (no limit needed). If we use a QL of 5, a limit is required. With a QL of 2, no limit is required. CN seems to be a common contaminant, especially with high nitrates. Anyway, any idea what we should be using?

Fact Sheet
Proctors Creek WWTP

Chloride

Facility = Proctors Creek WWTP
Chemical = Chlorides
Chronic averaging period = 4
WLAA = 1700
WLAC = 12000
Q.L. = 1
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 70
Variance = 1764
C.V. = 0.6
97th percentile daily values = 170.339
97th percentile 4 day average = 116.465
97th percentile 30 day average= 84.4237
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

70

Note: All effluent data above was submitted in the permit application. Chloride is expressed in mg/L and zinc is expressed in µg/L. As indicated, no limitations are needed for chloride or zinc at this time.

Zinc

Facility = Proctors Creek WWTP
Chemical = Zinc
Chronic averaging period = 4
WLAA = 260
WLAC = 4300
Q.L. = 5
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 23
Variance = 190.44
C.V. = 0.6
97th percentile daily values = 55.9686
97th percentile 4 day average = 38.2671
97th percentile 30 day average= 27.7392
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

23

Fact Sheet
Proctors Creek WWTP

Hydrogen Sulfide

Facility = Proctors Creek WWTP
Chemical = H₂S
Chronic averaging period = 4
WLAA =
WLAC = 100
Q.L. = 3.3
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:
observations = 2
Expected Value = 137
Variance = 6756.84
C.V. = 0.6
97th percentile daily values = 333.378
97th percentile 4 day average = 227.939
97th percentile 30 day average= 165.229
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 146.257478405323
Average Weekly limit = 146.257478405323
Average Monthly LImit = 146.257478405323

The data are:
270
4

Note: The data entered are expressed as µg/L. The QL and data used in the analyses were determined according to the January 29, 2003 email from Allan Brockenbrough (included in this attachment). As indicated, no limitation is necessary for this parameter at this time.

Facility = Proctors Creek WWTP
Chemical = H₂S
Chronic averaging period = 4
WLAA =
WLAC = 100
Q.L. = 3.3
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:
observations = 4
Expected Value = 3.84842
Variance = 5.33174
C.V. = 0.6
97th percentile daily values = 9.36483
97th percentile 4 day average = 6.40297
97th percentile 30 day average= 4.64140
< Q.L. = 2
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:
270
4
<3
<3

Fact Sheet
Proctors Creek WWTP

Ammonia

Facility = Proctors Creek WWTP

Chemical = Ammonia

Chronic averaging period = 30

WLAa = 20

WLAc = 55

Q.L. = 0.2

samples/mo. = 4

samples/wk. = 1

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average= 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 20

Average Weekly limit = 20

Average Monthly LImit = 13.6745144371859

The data are:

9.00

Note: 9.00 mg/L was used to force a limitation per Guidance Memorandum 00-2011. As indicated, a weekly average limitation of 20.0 mg/L and a monthly average limitation of 13.7 mg/L are necessary. However, antibacksliding prohibits the relaxation of limitations in this case; therefore, the reissued permit will retain the limitations as prescribed in the 2005 permit which were based on the Richmond Crater Water Quality Management Plan (RCWQMP).

Separate analyses specific to the seasonal tiers are not necessary as this analysis is the more stringent seasonal scenario (i.e. the annual inputs are the more stringent permitting scenario compared to seasonal limitations which offer relief).

Fact Sheet
Proctors Creek WWTP

TRC (2010)

Facility = Proctors Creek WWTP
Chemical = TRC
Chronic averaging period = 4
WLAA = 38
WLAC = 550
Q.L. = 100
samples/mo. = 360
samples/wk. = 84

Summary of Statistics:

observations = 1
Expected Value = 20000
Variance = 1440000
C.V. = 0.6
97th percentile daily values = 48668.3
97th percentile 4 day average = 33275.8
97th percentile 30 day average= 24121.0
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 38
Average Weekly limit = 17.6222084039412
Average Monthly LImit = 16.5447698165539

The data are:
20000

Note: 20,000 µg/L was used to force a limitation per Guidance Memorandum 00-2011. As indicated, the TRC weekly average limit is 18 µg/L; the TRC monthly average limit is 16 µg/L. However, antibacksliding prohibits the relaxation of limitations in this case; therefore, the reissued permit will retain the limitations as prescribed in the 2005 permit.

TRC (2005)

Facility = Proctor's Creek
Chemical = TRC
Chronic averaging period = 4
WLAA = 21
WLAC = 87
Q.L. = .1
samples/mo. = 30
samples/wk. = 7

Summary of Statistics:

observations = 1
Expected Value = 20000
Variance = 1440000
C.V. = 0.6
97th percentile daily values = 48668.3
97th percentile 4 day average = 33275.8
97th percentile 30 day average= 24121.0
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 21
Average Weekly limit = 12.8248513417926
Average Monthly LImit = 10.4080444412213

The data are:
20000

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Proctor's Creek WWTP

Permit No.: VA0060194

Receiving Stream: James River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO ₃) =	65.1 mg/L
90% Temperature (Annual) =	29 deg C
90% Temperature (Wet season) =	23 deg C
90% Maximum pH =	8 SU
10% Maximum pH =	7.05 SU
Tier Designation (1 or 2) =	1
Public Water Supply (PWS) Y/N? =	n
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	426 MGD
7Q10 (Annual) =	499 MGD
30Q10 (Annual) =	636 MGD
1Q10 (Wet season) =	1080 MGD
30Q10 (Wet season) =	1662 MGD
30Q5 =	704 MGD
Harmonic Mean =	2188 MGD
Annual Average =	N/A MGD

Mixing Information

Annual - 1Q10 Mix =	0.68 %
- 7Q10 Mix =	37.2 %
- 30Q10 Mix =	45.84 %
Wet Season - 1Q10 Mix =	1.52 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO ₃) =	86.25 mg/L
90% Temp (Annual) =	25 deg C
90% Temp (Wet season) =	21 deg C
90% Maximum pH =	8 SU
10% Maximum pH =	7.6 SU
Discharge Flow =	27 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	2.7E+03	--	--	na	7.3E+04	--	--	--	--	--	--	--	--	--	--	--	7.3E+04
Acrolein	0	--	--	na	7.8E+02	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	--	2.1E+04
Acrylonitrile ^c	0	--	--	na	6.6E+00	--	--	na	5.4E+02	--	--	--	--	--	--	--	--	--	--	--	5.4E+02
Aldrin ^c	0	3.0E+00	--	na	1.4E-03	3.3E+00	--	na	1.1E-01	--	--	--	--	--	--	--	--	3.3E+00	--	na	1.1E-01
Ammonia-N (mg/l) (Yearly)	0	8.41E+00	9.78E-01	na	--	9.3E+00	1.2E+01	na	--	--	--	--	--	--	--	--	--	9.3E+00	1.2E+01	na	--
Ammonia-N (mg/l) (High Flow)	0	8.41E+00	1.41E+00	na	--	1.4E+01	8.8E+01	na	--	--	--	--	--	--	--	--	--	1.4E+01	8.8E+01	na	--
Anthracene	0	--	--	na	1.1E+05	--	--	na	3.0E+06	--	--	--	--	--	--	--	--	--	--	--	3.0E+06
Antimony	0	--	--	na	4.3E+03	--	--	na	1.2E+05	--	--	--	--	--	--	--	--	--	--	--	1.2E+05
Arsenic	0	3.4E+02	1.5E+02	na	--	3.8E+02	1.2E+03	na	--	--	--	--	--	--	--	--	--	3.8E+02	1.2E+03	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzene ^c	0	--	--	na	7.1E+02	--	--	na	5.8E+04	--	--	--	--	--	--	--	--	--	--	--	5.8E+04
Benzidine ^c	0	--	--	na	5.4E-03	--	--	na	4.4E-01	--	--	--	--	--	--	--	--	--	--	--	4.4E-01
Benzo (a) anthracene ^c	0	--	--	na	4.9E-01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	--	--	--	4.0E+01
Benzo (b) fluoranthene ^c	0	--	--	na	4.9E-01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	--	--	--	4.0E+01
Benzo (k) fluoranthene ^c	0	--	--	na	4.9E-01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	--	--	--	4.0E+01
Benzo (a) pyrene ^c	0	--	--	na	4.9E-01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	--	--	--	4.0E+01
Bis2-Chloroethyl Ether	0	--	--	na	1.4E+01	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	--	3.8E+02
Bis2-Chloroisopropyl Ether	0	--	--	na	1.7E+05	--	--	na	4.6E+06	--	--	--	--	--	--	--	--	--	--	--	4.6E+06
Bromoform ^c	0	--	--	na	3.6E+03	--	--	na	3.0E+05	--	--	--	--	--	--	--	--	--	--	--	3.0E+05
Butylbenzylphthalate	0	--	--	na	5.2E+03	--	--	na	1.4E+05	--	--	--	--	--	--	--	--	--	--	--	1.4E+05
Cadmium	0	3.2E+00	8.4E-01	na	--	3.6E+00	6.6E+00	na	--	--	--	--	--	--	--	--	--	3.6E+00	6.6E+00	na	--
Carbon Tetrachloride ^c	0	--	--	na	4.4E+01	--	--	na	3.6E+03	--	--	--	--	--	--	--	--	--	--	--	3.6E+03
Chlordane ^c	0	2.4E+00	4.3E-03	na	2.2E-02	2.7E+00	3.4E-02	na	1.8E+00	--	--	--	--	--	--	--	--	2.7E+00	3.4E-02	na	1.8E+00
Chloride	0	8.6E+05	2.3E+05	na	--	9.5E+05	1.8E+06	na	--	--	--	--	--	--	--	--	--	9.5E+05	1.8E+06	na	--
TRC	0	1.9E+01	1.1E+01	na	--	2.1E+01	8.7E+01	na	--	--	--	--	--	--	--	--	--	2.1E+01	8.7E+01	na	--
Chlorobenzene	0	--	--	na	2.1E+04	--	--	na	5.7E+05	--	--	--	--	--	--	--	--	--	--	--	5.7E+05

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ^c	0	--	--	na	3.4E+02	--	--	na	2.8E+04	--	--	--	--	--	--	--	--	--	--	na	2.8E+04
Chloroform ^c	0	--	--	na	2.9E+04	--	--	na	2.4E+06	--	--	--	--	--	--	--	--	--	--	na	2.4E+06
2-Chloronaphthalene	0	--	--	na	4.3E+03	--	--	na	1.2E+05	--	--	--	--	--	--	--	--	--	--	na	1.2E+05
2-Chlorophenol	0	--	--	na	4.0E+02	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	9.2E-02	3.2E-01	na	--	--	--	--	--	--	--	--	--	9.2E-02	3.2E-01	na	--
Chromium III	0	4.9E+02	5.4E+01	na	--	5.5E+02	4.2E+02	na	--	--	--	--	--	--	--	--	--	5.5E+02	4.2E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.8E+01	8.7E+01	na	--	--	--	--	--	--	--	--	--	1.8E+01	8.7E+01	na	--
Chromium, Total	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene ^c	0	--	--	na	4.9E-01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	--	--	na	4.0E+01
Copper	0	1.1E+01	6.4E+00	na	--	1.3E+01	5.1E+01	na	--	--	--	--	--	--	--	--	--	1.3E+01	5.1E+01	na	--
Cyanide	0	2.2E+01	5.2E+00	na	2.2E+05	2.4E+01	4.1E+01	na	5.8E+06	--	--	--	--	--	--	--	--	2.4E+01	4.1E+01	na	5.8E+06
DDD ^c	0	--	--	na	8.4E-03	--	--	na	6.9E-01	--	--	--	--	--	--	--	--	--	--	na	6.9E-01
DDE ^c	0	--	--	na	5.9E-03	--	--	na	4.8E-01	--	--	--	--	--	--	--	--	--	--	na	4.8E-01
DDT ^c	0	1.1E+00	1.0E-03	na	5.9E-03	1.2E+00	7.9E-03	na	4.8E-01	--	--	--	--	--	--	--	--	1.2E+00	7.9E-03	na	4.8E-01
Demeton	0	--	1.0E-01	na	--	--	7.9E-01	na	--	--	--	--	--	--	--	--	--	7.9E-01	na	--	
Dibenz(a,h)anthracene ^c	0	--	--	na	4.9E-01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	--	--	na	4.0E+01
Dibutyl phthalate	0	--	--	na	1.2E+04	--	--	na	3.2E+05	--	--	--	--	--	--	--	--	--	--	na	3.2E+05
Dichloromethane																					
(Methylene Chloride) ^c	0	--	--	na	1.6E+04	--	--	na	1.3E+06	--	--	--	--	--	--	--	--	--	--	na	1.3E+06
1,2-Dichlorobenzene	0	--	--	na	1.7E+04	--	--	na	4.6E+05	--	--	--	--	--	--	--	--	--	--	na	4.6E+05
1,3-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	7.0E+04	--	--	--	--	--	--	--	--	--	--	na	7.0E+04
1,4-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	7.0E+04	--	--	--	--	--	--	--	--	--	--	na	7.0E+04
3,3-Dichlorobenzidine ^c	0	--	--	na	7.7E-01	--	--	na	6.3E+01	--	--	--	--	--	--	--	--	--	--	na	6.3E+01
Dichlorobromomethane ^c	0	--	--	na	4.6E+02	--	--	na	3.8E+04	--	--	--	--	--	--	--	--	--	--	na	3.8E+04
1,2-Dichloroethane ^c	0	--	--	na	9.9E+02	--	--	na	8.1E+04	--	--	--	--	--	--	--	--	--	--	na	8.1E+04
1,1-Dichloroethylene	0	--	--	na	1.7E+04	--	--	na	4.6E+05	--	--	--	--	--	--	--	--	--	--	na	4.6E+05
1,2-trans-dichloroethylene	0	--	--	na	1.4E+05	--	--	na	3.8E+06	--	--	--	--	--	--	--	--	--	--	na	3.8E+06
2,4-Dichlorophenol	0	--	--	na	7.9E+02	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane ^c	0	--	--	na	3.9E+02	--	--	na	3.2E+04	--	--	--	--	--	--	--	--	--	--	na	3.2E+04
1,3-Dichloropropene	0	--	--	na	1.7E+03	--	--	na	4.6E+04	--	--	--	--	--	--	--	--	--	--	na	4.6E+04
Dieldrin ^c	0	2.4E-01	5.6E-02	na	1.4E-03	2.7E-01	4.4E-01	na	1.1E-01	--	--	--	--	--	--	--	--	2.7E-01	4.4E-01	na	1.1E-01
Diethyl Phthalate	0	--	--	na	1.2E+05	--	--	na	3.2E+06	--	--	--	--	--	--	--	--	--	--	na	3.2E+06
Di-2-Ethylhexyl Phthalate ^c	0	--	--	na	5.9E+01	--	--	na	4.8E+03	--	--	--	--	--	--	--	--	--	--	na	4.8E+03
2,4-Dimethylphenol	0	--	--	na	2.3E+03	--	--	na	6.2E+04	--	--	--	--	--	--	--	--	--	--	na	6.2E+04
Dimethyl Phthalate	0	--	--	na	2.9E+06	--	--	na	7.9E+07	--	--	--	--	--	--	--	--	--	--	na	7.9E+07
Di-n-Butyl Phthalate	0	--	--	na	1.2E+04	--	--	na	3.2E+05	--	--	--	--	--	--	--	--	--	--	na	3.2E+05
2,4-Dinitrophenol	0	--	--	na	1.4E+04	--	--	na	3.8E+05	--	--	--	--	--	--	--	--	--	--	na	3.8E+05
2-Methyl-4,6-Dinitrophenol	0	--	--	na	7.65E+02	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04
2,4-Dinitrotoluene ^c	0	--	--	na	9.1E+01	--	--	na	7.5E+03	--	--	--	--	--	--	--	--	--	--	na	7.5E+03
Uioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	na	1.2E-06	--	--	na	na	--	--	--	--	--	--	--	--	--	--	na	na
1,2-Diphenylhydrazine ^c	0	--	--	na	5.4E+00	--	--	na	4.4E+02	--	--	--	--	--	--	--	--	--	--	na	4.4E+02
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	2.4E-01	4.4E-01	na	6.5E+03	--	--	--	--	--	--	--	--	2.4E-01	4.4E-01	na	6.5E+03
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	2.4E-01	4.4E-01	na	6.5E+03	--	--	--	--	--	--	--	--	2.4E-01	4.4E-01	na	6.5E+03
Endosulfan Sulfate	0	--	--	na	2.4E+02	--	--	na	6.5E+03	--	--	--	--	--	--	--	--	--	--	na	6.5E+03
Endrin	0	8.6E-02	3.6E-02	na	8.1E-01	9.5E-02	2.8E-01	na	2.2E+01	--	--	--	--	--	--	--	--	9.5E-02	2.8E-01	na	2.2E+01
Endrin Aldehyde	0	--	--	na	8.1E-01	--	--	na	2.2E+01	--	--	--	--	--	--	--	--	--	--	na	2.2E+01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Ethylbenzene	0	--	--	na	2.9E+04	--	--	na	7.9E+05	--	--	--	--	--	--	--	--	--	--	na	7.9E+05	
Fluoranthene	0	--	--	na	3.7E+02	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	--	--	na	1.0E+04	
Fluorene	0	--	--	na	1.4E+04	--	--	na	3.8E+05	--	--	--	--	--	--	--	--	--	--	na	3.8E+05	
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
Guthion	0	--	1.0E-02	na	--	--	7.9E-02	na	--	--	--	--	--	--	--	--	--	--	7.9E-02	na	--	
Heptachlor ^c	0	5.2E-01	3.8E-03	na	2.1E-03	5.8E-01	3.0E-02	na	1.7E-01	--	--	--	--	--	--	--	--	5.8E-01	3.0E-02	na	1.7E-01	
Heptachlor Epoxide ^c	0	5.2E-01	3.8E-03	na	1.1E-03	5.8E-01	3.0E-02	na	9.0E-02	--	--	--	--	--	--	--	--	5.8E-01	3.0E-02	na	9.0E-02	
Hexachlorobenzene ^c	0	--	--	na	7.7E-03	--	--	na	6.3E-01	--	--	--	--	--	--	--	--	--	--	na	6.3E-01	
Hexachlorobutadiene ^c	0	--	--	na	5.0E+02	--	--	na	4.1E+04	--	--	--	--	--	--	--	--	--	--	na	4.1E+04	
Hexachlorocyclohexane																						
Alpha-BHC ^c	0	--	--	na	1.3E-01	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01	
Hexachlorocyclohexane																						
Beta-BHC ^c	0	--	--	na	4.6E-01	--	--	na	3.8E+01	--	--	--	--	--	--	--	--	--	--	na	3.8E+01	
Hexachlorocyclohexane																						
Gamma-BHC ^c (Lindane)	0	9.5E-01	na	na	6.3E-01	1.1E+00	--	na	5.2E+01	--	--	--	--	--	--	--	--	1.1E+00	--	na	5.2E+01	
Hexachlorocyclopentadiene																						
Hexachloroethane ^c	0	--	--	na	1.7E+04	--	--	na	4.6E+05	--	--	--	--	--	--	--	--	--	--	na	4.6E+05	
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	1.6E+01	na	--	--	--	--	--	--	--	--	--	--	1.6E+01	na	--	
Indeno (1,2,3-cd) pyrene ^c	0	--	--	na	4.9E-01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	--	--	na	4.0E+01	
Iron																						
Isophorone ^c	0	--	--	na	2.6E+04	--	--	na	2.1E+06	--	--	--	--	--	--	--	--	--	--	na	2.1E+06	
Kepone																				0.0E+00	na	--
Lead	0	9.6E+01	8.2E+00	na	--	1.1E+02	6.5E+01	na	--	--	--	--	--	--	--	--	--	--	1.1E+02	6.5E+01	na	--
Malathion																				7.9E-01	na	--
Manganese																				--	na	--
Mercury	0	1.4E+00	7.7E-01	na	5.1E-02	1.6E+00	6.1E+00	na	1.4E+00	--	--	--	--	--	--	--	--	--	1.6E+00	6.1E+00	na	1.4E+00
Methyl Bromide																				--	na	1.1E+05
Methoxychlor																				2.4E-01	na	--
Mirex																				0.0E+00	na	--
Monochlorobenzene																				--	na	5.7E+05
Nickel	0	1.6E+02	1.5E+01	na	4.6E+03	1.7E+02	1.1E+02	na	1.2E+05	--	--	--	--	--	--	--	--	--	1.7E+02	1.1E+02	na	1.2E+05
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
Nitrobenzene																				na	5.1E+04	
N-Nitrosodimethylamine ^c	0	--	--	na	8.1E+01	--	--	na	6.6E+03	--	--	--	--	--	--	--	--	--	--	na	6.6E+03	
N-Nitrosodiphenylamine ^c	0	--	--	na	1.6E+02	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	na	1.3E+04	
N-Nitrosodi-n-propylamine ^c	0	--	--	na	1.4E+01	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	--	--	na	1.1E+03	
Parathion	0	6.5E-02	1.3E-02	na	--	7.2E-02	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	7.2E-02	1.0E-01	na	--
PCB-1016	0	--	1.4E-02	na	--	--	1.1E-01	na	--	--	--	--	--	--	--	--	--	--	1.1E-01	na	--	
PCB-1221	0	--	1.4E-02	na	--	--	1.1E-01	na	--	--	--	--	--	--	--	--	--	--	1.1E-01	na	--	
PCB-1232	0	--	1.4E-02	na	--	--	1.1E-01	na	--	--	--	--	--	--	--	--	--	--	1.1E-01	na	--	
PCB-1242	0	--	1.4E-02	na	--	--	1.1E-01	na	--	--	--	--	--	--	--	--	--	--	1.1E-01	na	--	
PCB-1248	0	--	1.4E-02	na	--	--	1.1E-01	na	--	--	--	--	--	--	--	--	--	--	1.1E-01	na	--	
PCB-1254	0	--	1.4E-02	na	--	--	1.1E-01	na	--	--	--	--	--	--	--	--	--	--	1.1E-01	na	--	
PCB-1260	0	--	1.4E-02	na	--	--	1.1E-01	na	--	--	--	--	--	--	--	--	--	--	1.1E-01	na	--	
PCB Total ^c	0	--	--	na	1.7E-03	--	--	na	1.4E-01	--	--	--	--	--	--	--	--	--	--	na	1.4E-01	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Pentachlorophenol ^c	0	1.4E+01	7.3E+00	na	8.2E+01	1.6E+01	5.8E+01	na	6.7E+03	--	--	--	--	--	--	--	--	1.6E+01	5.8E+01	na	6.7E+03	
Phenol	0	--	--	na	4.6E+06	--	--	na	1.2E+08	--	--	--	--	--	--	--	--	--	--	--	na	1.2E+08
Pyrene	0	--	--	na	1.1E+04	--	--	na	3.0E+05	--	--	--	--	--	--	--	--	--	--	--	na	3.0E+05
Radionuclides (pCi/l except Beta/Photon)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity Beta and Photon Activity (mrem/yr)	0	--	--	na	1.5E+01	--	--	na	4.1E+02	--	--	--	--	--	--	--	--	--	--	--	na	4.1E+02
Strontrium-90	0	--	--	na	8.0E+00	--	--	na	2.2E+02	--	--	--	--	--	--	--	--	--	--	--	na	2.2E+02
Tritium	0	--	--	na	2.0E+04	--	--	na	5.4E+05	--	--	--	--	--	--	--	--	--	--	--	na	5.4E+05
Selenium	0	2.0E+01	5.0E+00	na	1.1E+04	2.2E+01	3.9E+01	na	3.0E+05	--	--	--	--	--	--	--	--	2.2E+01	3.9E+01	na	3.0E+05	
Silver	0	2.6E+00	--	na	--	2.8E+00	--	na	--	--	--	--	--	--	--	--	--	2.8E+00	--	na	--	
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane ^c	0	--	--	na	1.1E+02	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	--	na	9.0E+03
Tetrachloroethylene ^c	0	--	--	na	8.9E+01	--	--	na	7.3E+03	--	--	--	--	--	--	--	--	--	--	--	na	7.3E+03
Thallium	0	--	--	na	6.3E+00	--	--	na	1.7E+02	--	--	--	--	--	--	--	--	--	--	--	na	1.7E+02
Toluene	0	--	--	na	2.0E+05	--	--	na	5.4E+06	--	--	--	--	--	--	--	--	--	--	--	na	5.4E+06
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene ^c	0	7.3E-01	2.0E-04	na	7.5E-03	8.1E-01	1.6E-03	na	6.2E-01	--	--	--	--	--	--	--	--	8.1E-01	1.6E-03	na	6.2E-01	
Tributyltin	0	4.6E-01	6.3E-02	na	--	5.1E-01	5.0E-01	na	--	--	--	--	--	--	--	--	--	5.1E-01	5.0E-01	na	--	
1,2,4-Trichlorobenzene	0	--	--	na	9.4E+02	--	--	na	2.5E+04	--	--	--	--	--	--	--	--	--	--	--	na	2.5E+04
1,1,2-Trichloroethane ^c	0	--	--	na	4.2E+02	--	--	na	3.4E+04	--	--	--	--	--	--	--	--	--	--	--	na	3.4E+04
Trichloroethylene ^c	0	--	--	na	8.1E+02	--	--	na	6.6E+04	--	--	--	--	--	--	--	--	--	--	--	na	6.6E+04
2,4,6-Trichlorophenol ^c	0	--	--	na	6.5E+01	--	--	na	5.3E+03	--	--	--	--	--	--	--	--	--	--	--	na	5.3E+03
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride ^c	0	--	--	na	6.1E+01	--	--	na	5.0E+03	--	--	--	--	--	--	--	--	--	--	--	na	5.0E+03
Zinc	0	1.0E+02	8.5E+01	na	6.9E+04	1.1E+02	6.7E+02	na	1.9E+06	--	--	--	--	--	--	--	--	1.1E+02	6.7E+02	na	1.9E+06	

- Notes:
- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
 - Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
 - Metals measured as Dissolved, unless specified otherwise
 - "C" indicates a carcinogenic parameter
 - Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
 - Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
 - WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	1.2E+05
Arsenic	1.5E+02
Barium	na
Cadmium	1.4E+00
Chromium III	2.2E+02
Chromium VI	7.1E+00
Copper	5.1E+00
Iron	na
Lead	3.9E+01
Manganese	na
Mercury	6.2E-01
Nickel	6.9E+01
Selenium	8.9E+00
Silver	1.1E+00
Zinc	4.5E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Fact Sheet
Proctors Creek WWTP

Attachment G

Richmond Crater Water Quality Management Plan

SEGMENT	SEGMENT NUMBER	MILE TO MILE	CLASSIFICATION
USGS HUC02080206 James River	2-19	115.0-60.5	W.Q.
USGS HUC02080207 Appomattox	2-23	30.1-0.0	W.Q.

TABLE B6- * Note: A new stream segment classification for the Upper James Basin was adopted in 1981. The SWCB will renumber or realign these segments in the future to reflect these changes. This Plan covers only a portion of these segments.

TABLE B7 - RICHMOND CRATER INTERIM WATER QUALITY MANAGEMENT PLAN- CURRENT PERMITTED WASTE LOADS (March 1988)

	SUMMER (June-October)						WINTER (November-May)						
	FLOW (mgd)	BOD5		NH3-N1			FLOW (mgd)	BOD5		NH3-N1		DO2 (mg/l)	
		(lbs/d)	(mg/l)	(lbs/d)	(mg/l)			(lbs/d)	(mg/l)	(lbs/d)	(mg/l)		
City of Richmond STP3	45.00	3002	8.0	-	-	-	45.00	5367	-	-	-	-	
E.I. DuPont-Spruance	8.68	936	-	-	-	-	8.68	936	-	-	-	-	
Falling Creek STP	9.00	1202	16.0	-	-	5.9	9.00	2253	30.0	-	-	5.9	
Proctor's Creek STP	6.40	1601	30.0	-	-	5.9	11.80	2952	30.0	-	-	5.9	
Reynolds Metals Company	0.39	138	-	7	-	-	0.39	138	-	7	-	-	
Henrico STP	30.00	3005	12.0	-	-	5.9	30.00	7260	29.0	-	-	5.9	
American Tobacco Company	1.94	715	-	-	-	-	1.94	716	-	-	-	-	
ICI Americas, Inc.	0.20	152	-	-	-	-	0.20	152	-	-	-	-	
Phillip Morris- Park 500	1.50	559	-	-	-	-	1.50	557	-	-	-	-	
Allied (Chesterfield)	51.00	1207	-	-	-	-	51.00	1207	-	-	-	-	
Allied (Hopewell)	150.00	2500	-	-	-	-	150.00	2500	-	-	-	-	
Hopewell Regional WTF	34.08	12507	44.0	-	-	4.8	34.08	12507	44.0	-	-	4.8	
Petersburg STP	15.00	2804	22.4	-	-	5.0	15.00	2804	22.4	-	-	5.0	
TOTAL	353.19	30328					358.59	39349					

1 NH3-N values represent ammonia as nitrogen.

2 Dissolved oxygen limits represent average minimum allowable levels.

3 Richmond STP's BOD5 is permitted as CBOD5

TABLE B7 - WASTE LOAD ALLOCATIONS FOR THE YEAR 1990

	SUMMER (June-October)						WINTER (November-May)						
	FLOW (mgd)	CBOD5		NH3-N1,3			FLOW (mgd)	CBOD5		NH3-N1		DO2 (mg/l)	
		(lbs/d)	(mg/l)	(lbs/d)	(mg/l)			(lbs/d)	(mg/l)	(lbs/d)	(mg/l)		
City of Richmond STP	45.00	3002	8.0	2403	6.4	5.6	5367	14.3	5707	15.2	5.6		
E.I. DuPont-Spruance	11.05	948		590		4.4	948		756		2.9		
Falling Creek STP	10.10	1348	16.0	539	6.4	5.9	2023	24.0	1281	15.2	5.9		
Proctor's Creek STP	12.00	1602	16.0	961	9.6	5.9	2403	24.0	1402	14.0	5.9		
Reynolds Metals Co.	0.49	172		8		6.5	172		8		6.5		
Henrico STP	30.00	3002	12.0	2403	9.6	5.6	4756	19.0	3504	44.0	5.6		
American Tobacco Co.	2.70	715		113		5.8	715		113		5.8		
ICI Americas, Inc.	0.20	167		8		5.8	167		8		3.1		
Phillip Morris- Park 500	2.20	819		92		4.6	819		92		4.6		
Allied (Chesterfield)	53.00	1255		442		5.7	1255		442		5.7		

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WATER QUALITY MANAGEMENT PLANNING REGULATION.

Allied (Hopewell)	165.00	2750		10326		6.1		2750		10326		6.1
Hopewell Regional WTF	34.07	12502	44.0	12091	36.2	4.8		12502	44.0	10291	36.2	4.8
Petersburg STP	15.00	2802	22.4	801	6.4	5.0		2802	22.4	2028	16.2	5.0
TOTAL	380.81	31084		28978				36679	35958			

1 NH3-N values represent ammonia as nitrogen.

2 Dissolved oxygen limits represent average minimum allowable levels.

3 Allied (Hopewell) allocation may be redistributed to the Hopewell Regional WTF by VPDES permit.

TABLE B7- WASTE LOAD ALLOCATION FOR THE YEAR 2000

	SUMMER (June-October)						WINTER (November-May)					
	FLOW (mgd)	CBOD5		NH3-N1,3		DO2 (mg/l)	CBOD5		NH3-N1		DO2 (mg/l)	
		(lbs/d)	(mg/l)	(lbs/d)	(mg/l)		(lbs/d)	(mg/l)	(lbs/d)	(mg/l)		
City of Richmond STP	45.08	3002	8.0	2403	6.4	5.6	5367	14.3		15.2	5.6	
E.I. DuPont-Spruance	196.99	948		590		4.4	948		756		2.9	
Falling Creek STP	10.10	1348	16.0	539	6.4	5.9	2023	24.0	1281	15.2	5.9	
Proctor's Creek STP	16.80	1602	11.4	961	6.9	5.9	2403	17.1	1402	10.0	5.9	
Reynolds Metals Co.	0.78	172		13		6.5	172		13		6.5	
Henrico STP	32.80	3002	11.0	2403	8.8	5.6	4756	17.4	3504	12.8	5.6	
American Tobacco Co.	3.00	715		113		5.8	715		113		5.8	
ICI Americas, Inc.	0.20	167		8		5.8	167		8		3.1	
Philip Morris- Park 500	2.90	819		92		4.6	819		92		4.6	
Allied (Chesterfield)	56.00	1255		442		5.7	1255		442		5.7	
Allied (Hopewell)	170.00	2750		10326		6.1	2750		10326		6.1	
Hopewell Regional WTF	36.78	12502	40.7	12091	33.5	4.8	12502	40.7	10291	33.5	4.8	
Petersburg STP	15.00	2802	22.4	801	6.4	5.0	2802	22.4	2028	16.2	5.0	
TOTAL	406.43	31084		28982			36679		35963			

1 NH3-N values represent ammonia as nitrogen.

2 Dissolved oxygen limits represent average minimum allowable levels.

3 Allied (Hopewell) allocation may be redistributed to the Hopewell Regional WTF by VPDES permit.

TABLE B7- WASTE LOAD ALLOCATIONS FOR THE YEAR 2010

	SUMMER (June-October)						WINTER (November-May)					
	FLOW (mgd)	CBOD5		NH3-N1,3		DO2 (mg/l)	CBOD5		NH3-N1		DO2 (mg/l)	
		(lbs/d)	(mg/l)	(lbs/d)	(mg/l)		(lbs/d)	(mg/l)	(lbs/d)	(mg/l)		
City of Richmond STP	45.86	3002	7.8	2403	6.3	5.6	5367	14.0		14.9	5.6	
E.I. DuPont-Spruance	16.99	948		590		4.4	948		756		2.9	
Falling Creek STP	10.10	1348	16.0	539	6.4	5.9	2023	24.0	1281	15.2	5.9	
Proctor's Creek STP	24.00	1602	8.0	961	4.8	5.9	2403	12.0	1402	7.0	5.9	
Reynolds Metals Co.	0.78	172		13		6.5	172		13		6.5	
Henrico STP	38.07	3002	9.5	2403	7.6	5.6	4756	15.0	3504	11.0	5.6	
American Tobacco Co.	3.00	715		113		5.8	715		113		5.8	
ICI Americas, Inc.	0.20	167		8		5.8	167		8		3.1	
Phillip Morris- Park 500	2.90	819		92		4.6	819		92		4.6	
Allied (Chesterfield)	56.00	1255		442		5.7	1255		442		5.7	
Allied (Hopewell)	180.00	2750		10326		6.1	2750		10326		6.1	
Hopewell Regional WTF	39.61	12502	37.8	10291	31.1	4.8	12502	37.8	10291	31.1	4.8	
Petersburg STP	15.00	2802	22.4	801	6.4	5.0	2802	22.4	2028	16.2	5.0	
TOTAL	432.1	31084		28982			36679		35963			

1 NH3-N values represent ammonia as nitrogen.

2 Dissolved oxygen limits represent average minimum allowable levels.

3 Allied (Hopewell) allocation may be redistributed to the Hopewell Regional WTF by VPDES permit.

9 VAC 25-720-80. Roanoke River Basin.

Fact Sheet
Proctors Creek WWTP

Attachment H

PER Summary Documents

EXECUTIVE SUMMARY

Chesterfield County (County) retained the services of ***R. Stuart Royer and Associates, Inc.*** (***Royer***) to prepare a Preliminary Engineering Report (PER) to address compliance of their Proctors Creek Wastewater Treatment Plant (PCWWTP) and Falling Creek Wastewater Treatment Plant (FCWWTP) with the Chesapeake Bay Nutrient Regulations. These regulations require improvements to the County's WWTPs in order to comply with the nutrient allocations for the two combined plants. This PER reviews alternatives selected by the County to meet the County's wasteload allocation and future design conditions. The nutrient allocations and influent characteristics selected with the County for the analysis are presented here as the Tables of the report.

Table 1. Nutrient Allocations for Proctors and Falling Creek Treatment Plants

	<u>Proctors Creek</u>	<u>Falling Creek</u>	<u>Sum of Plant Loads</u>
Permitted Flow, MGD	27.0	10.1	
TN Load Cap, lbs/yr	411,151	153,801	564,952
TP Load Cap, lbs/yr	41,115	15,380	56,495

These allocations result in annual average concentrations of 5 mg/L for Total Nitrogen (TN) and 0.5 mg/L for Total Phosphorus (TP).

Table 5. Proctors Creek and Falling Creek Influent Sampling Data Summary

Analysis Average	Proctors Creek Influent	Typical Characteristics	Falling Creek Influent	Past Design Characteristics ¹
BOD, mg/L	201	220	128	141
TSS, mg/L	239	220	157	183
TKN, mg/L	37.8	40	30.7	31
TP, mg/L	7.60	8	4.57	6.8

Table 6. Proctors Creek and Falling Creek Primary Clarifier Effluent Design Values

Analysis Average	Proctors Creek Primary Clarifier Effluent	Proctors Creek Design Characteristics	Falling Creek Primary Clarifier Effluent Data ²	Falling Creek Design Characteristics ³
BOD, mg/L	91.5	150	99	99
TSS, mg/L		113	82	82
TKN, mg/L	26.0	36	24	24
TP, mg/L	5.04	5.3	3.1	3.1

¹ Design Characteristics taken from "Improvements for Biological Nutrient Removal at the Falling Creek Wastewater Treatment Facility, Preliminary Design Report," Prepared by Black & Veatch, March 1990.

² Ibid

³ Ibid

Falling Creek is the critical path to compliance with the nutrient load allocations, and design of the Falling Creek facility improvements should proceed immediately in order to meet the January 1, 2011, deadline for compliance. Proctors Creek requires treatment improvements to permit growth in the service population, but these improvements can proceed on a slight delay compared to the Falling Creek construction.

Three alternatives were considered for each facility. These include conventional activated sludge treatment with denitrification filters (nitrification-denitrification nutrient removal process), four-stage nutrient removal utilizing integrated fixed-film in the activated sludge (IFAS), and four-stage nutrient removal process utilizing membrane filtration (MBR) for liquid-solids separation.

IDI conducted a pilot plant at PCWWTP from the summer of 2006 through spring of 2007. The results of this pilot plant indicate the IDI IFAS process will adequately treat the PCWWTP wastewater. Comparison of the three alternatives reviewed indicates that the IFAS process results in the least capital cost, the least time to accomplish construction, and minimizes the impact on available real estate at each facility.

The preliminary opinion of probable construction cost (OPCC) associated with the IFAS alternative at the two facilities is \$41,749,772 (PCWWTP) and \$28,311,660 (FCWWTP).⁴ The total opinion of probable project cost (OPPC) is \$131,094,141.⁵

Design of the recommended FCWWTP alternative should begin no later than June 1, 2007 in order to meet the state legislated date of December 31, 2010.

1. Specific evaluations that should precede final equipment selection:
 - a. Selection of a carbon source chemical for use in denitrification
 - b. Pilot Plant data should be analyzed thoroughly to confirm kinetics for the IFAS
 - c. Primary Clarifier Effluent data collection for both plants should continue and be thoroughly analyzed during design
 - d. Collection system data related to storm flows and pump station modifications that direct flow to Proctors Creek must be collected and analyzed
2. Hydraulic and Capacity analyses should begin for the Proctors Creek and Falling Creek facilities to determine the bottlenecks for plant expansions. This should include solids handling alternatives.

⁴ OPCC only includes the ENR work and does not include Design, CA, Resident Project Representative, or contingency.

⁵ OPPC includes Opinion of Probable Construction Cost for all work at PC and FC, Design, CA, Resident Project Representative, but not 20% contingency.

CONCLUSIONS

1. Chesapeake Bay Nutrient Regulations require that improvements be made to the Chesterfield County WWTPs to comply with the nutrient allocations for the two combined plants.
2. Chesapeake Bay Nutrient Trading Legislation allows the plants to assist each other, and the improvements should be considered simultaneously. County participation in the general permit for nutrients could allow some flexibility in achieving discharge goals by negotiation with other dischargers.
3. Falling Creek is the critical path to compliance with the nutrient load allocations and treatment must be improved at this facility.
4. An Integrated Fixed Film Activated Sludge (IFAS) Process is the preferred biological process for the Falling Creek Plant.
5. The county should be able to meet their WLA in 2011 based on flows and their reuse agreement with Dominion Virginia Power.
6. Proctors Creek requires treatment improvements to permit growth in the service population, but these improvements can proceed on a slight delay compared to the Falling Creek construction.
7. An Integrated Fixed Film Activated Sludge (IFAS) Process is the preferred biological process for the Proctors Creek Plant. IFAS will provide increased nitrification capacity from 21.5 MGD to 27 MGD and also increase the seasonal denitrification capacity to meet 5 mg/L TN limit.

RECOMMENDATIONS AND SCHEDULE

The County should let the trading rules and Association evolve, while planning to implement their own improvements at the Proctors Creek and Falling Creek facilities for nutrient wasteload (General Permit) compliance.

1. Falling Creek is the critical path to compliance with the nutrient load allocations, and design of the facility should proceed. IFAS should be considered the selected technology.
2. County staff should visit facilities with the selected technologies and speak with operators at those facilities to determine how the equipment will function and be maintained. Any concerns about specific equipment should be resolved prior to final design. This requires additional data be collected from manufacturers or operating facilities, if available.
3. Specific evaluations that should precede final equipment selection:
 - a. Selection of a carbon source chemical for denitrification
 - b. Pilot Plant data should be analyzed thoroughly to confirm kinetics for the IFAS
 - c. Primary Clarifier Effluent data collection for both plants should continue and be thoroughly analyzed during design
 - d. Collection system data related to storm flows and pump station modifications that direct flow to Proctors Creek must be collected and analyzed
4. Hydraulic and Capacity analyses should begin for the Proctors Creek and Falling Creek facilities to determine the bottlenecks for plant expansions. This should include solids handling alternatives.
5. Evaluations may proceed pending DEQ approval, but full design should wait until DEQ is satisfied.
6. Construction financing should be arranged so that construction can proceed with the conclusion of the design. Identification of funding sources should be done as early as possible in the process.
8. The following schedule is recommended for proceeding with the improvements to the Chesterfield County Wastewater Facilities.

Estimated Schedule for Proceeding with WWTP Improvements

The schedule for the improvements to the two Chesterfield County Wastewater Treatment Facilities is shown in Appendix E with this report. Major milestones from this schedule are shown in the following table.

R. STUART ROYER & ASSOCIATES, INC.

CONSULTING ENGINEERS

Founded 1928

April 8, 2008

Mr. Scott Smedley
Superintendent of Wastewater Treatment
Chesterfield County – DPU
Proctors Creek WWTP
1200 Coxendale Rd.
Chester, VA 23836

RE: Chesterfield County, Virginia
FCWWTP DEQ Permit
RSR Project No. 0730

Dear Mr. Smedley:

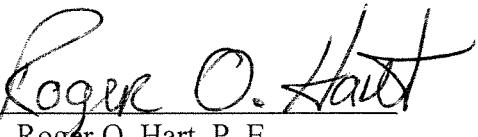
We offer the following regarding the proposed modifications to the Falling Creek Wastewater Treatment Plant (FCWWTP). The preliminary engineering report (PER) and the associated process nutrient removal alternatives reviewed were based on an annual waste load allocation (WLA) of 153,801 lb/yr at FCWWTP and 411,151 lb/yr at the Proctors Creek waste water treatment plant (PCWWTP). The WLA is based on effluent total nitrogen (TN) concentration of 5.0 mg/l with flows of 10.1 mgd and 27 mgd at FCWWTP and PCWWTP respectively. It is our understanding that the Chesterfield County WLA is a bubble permit that incorporates both Proctors Creek and Falling Creek resulting in a total WLA for the county rather than two separate WLAs (one for each facility). The total TN WLA for Chesterfield County is 564,952 lb/yr.

We note that the ongoing design is based on the WLA. It is not based on an effluent TN concentration. As such the facility is not expected to continuously meet an effluent TN concentration of 5.0 mg/l. We note that we supported the County in their WQIF agreement of 5.0 mg/l that with an exceedence of 0.8 mg/l for an actual effluent TN of 5.8 mg/l annual average. Therefore, while it is not possible to predict future TN concentrations it is our professional opinion that the upgraded facility should meet an effluent TN annual average of 5.8mg/l.

Chesterfield County plans to meet their nutrient load allocation for Falling Creek WWTP and Proctors Creek WWTP through the following mechanisms; 1) a nutrient allocation bubble between the two facilities, 2) Integrated-fixed-film biological nutrient removal upgrades to both facilities, 3) water reuse agreement with Dominion Power and any future water reuse partners.

We appreciate the opportunity to comment on the nutrient loading for Falling Creek. If additional information is needed, please let us know.

Yours truly,
R. Stuart Royer & Associates, Inc.

By 
Roger O. Hart, P. E.

TFT/nca
P:Chesterfield County 0730 BNR\SmedleyS 04 08 08 TFT FCWWTP DEQ Permit

Fact Sheet
Proctors Creek WWTP

Attachment I

WET Testing Evaluation and Memorandum



MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY *Piedmont Regional Office*

4949-A Cox Road

Glen Allen, VA 23060

804/527-5020

SUBJECT: Whole Effluent Toxicity (WET) Test Data Review:
Proctors Creek WWTP, VPDES Permit No. VA0060194

TO: Curtis J. Linderman, Water Permit Manager, PRO

FROM: Gina Kelly, PRO

DATE: January 21, 2010

COPIES: Deborah DeBiasi, CO - WET

Facility Name: Proctors Creek WWTP
Permit Number: VA0060194
Receiving Stream James River (Lower) - Freshwater tidal
Facility SIC: 4952
In-stream Waste Concentration (IWC): Outfall 001: IWC_{acute} 2%, IWC_{chronic} 50%
Effluent Design Flow 27 MGD

FACILITY DESCRIPTION

The permit for this municipal discharger is in the process of reissuance. Proctors Creek WWTP is owned and operated by Chesterfield County; the actual facility is located at 1200 Coxendale Rd., Chester, VA. The facility discharges treated wastewater (mostly municipal with some industrial contributors) through outfall 001 to the James River.

FACILITY REQUIREMENTS

The expiring VPDES permit contains a WET Testing Program for outfall 001; requirements of the WET tests are based on Guidance Memorandum Number 00-2012.

The expiring permit was reissued effective June 20, 2005 and included a Whole Effluent Toxicity Program special condition requiring annual monitoring for outfall 001. Required testing included chronic tests using *Ceriodaphnia dubia* and *Pimephales promelas*; both testing scenarios required 24-hour flow-proportioned effluent samples. All toxicity tests were performed by James Reed and Associates. No quality control problems were found in any of the tests performed for the VPDES permit.

Static renewal chronic tests were also to be performed with these two test species; the chronic test endpoint was an NOEC of 31%.

Results of the whole effluent toxicity tests performed on samples since the permit reissuance in 2005 indicate compliance with the WET Program in the 2005 permit.

The proposed special condition language is attached. Also attached is the WETLim10 spreadsheet, which was used to compute the endpoints for acute and chronic toxicity contained in the special condition. At the bottom of page three is a recommended dilution series for the chronic tests which, if used will simplify the

determination of compliance with the chronic toxicity endpoint contained in the permit.

DATA SUMMARY

Table 1: Results of Chronic Toxicity Tests *P.promelas*.

TEST DATE	TEST RESULT	% SURVIVAL IN 100% EFFLUENT	TEST LAB	COMMENTS
September 2005	NOEC= 100%	95%	James R. Reed & Associates	[none]
June 2006	NOEC= 100%	95%	James R. Reed & Associates	1, 2
June 2007	NOEC= 100%	100%	James R. Reed & Associates	1, 2
June 2008	Survival NOEC = 56% Growth NOEC = 31%	97.5%	James R. Reed & Associates	1, 2
August 2009	NOEC= 100%	95%	James R. Reed & Associates	1, 2, 3

Table 2: Results of Chronic Toxicity Tests *C. dubia*.

TEST DATE	TEST RESULT	% SURVIVAL IN 100% EFFLUENT	TEST LAB	COMMENTS
September 2005	NOEC= 100%	100%	James R. Reed & Associates	[none]
June 2006	NOEC= 100%	80%	James R. Reed & Associates	1, 2
June 2007	NOEC= 100%	90%	James R. Reed & Associates	1, 2
June 2008	NOEC= 100%	100%	James R. Reed & Associates	1, 2
August 2009	NOEC= 100%	90%	James R. Reed & Associates	1, 2

Comments:

1. No notation regarding whether sample had to be filtered or not (assumed “not” unless noted).
2. Feeding information (what, when) during the testing was not provided.
3. Renewal did not occur within 24 ± 2 hrs.

CONCLUSIONS & RECOMMENDATIONS

The results of these toxicity tests for outfall 001 are summarized in Tables 1 & 2, above. As indicated, all tests met the appropriate toxicity criterion. Thus, these annual compliance toxicity tests indicate that effluent from outfall 001 has not demonstrated toxicity at instream exposures.

The permitting staff recommend continuing the annual chronic whole effluent toxicity testing during the upcoming permit cycle. Draft WET Special Condition language follows.

Whole Effluent Toxicity (WET) Monitoring Program

E. Whole Effluent Toxicity (WET) Monitoring Program

1. Biological Monitoring

- a. In accordance with the schedule in Part I.E.2 below, the permittee shall perform annual chronic toxicity testing on Outfall 001 using 24-hour flow-proportioned composite samples for the duration of the permit. The chronic tests to use are:

Chronic 3-Brood Survival and Reproduction Static Renewal Test with *Ceriodaphnia dubia*

Chronic 7-Day Survival and Growth Static Renewal Test with *Pimephales promelas*

These chronic tests shall be conducted in such a manner and at sufficient dilutions (minimum of five dilutions, derived geometrically) to determine the "No Observed Effect Concentration" (NOEC) for survival and reproduction or growth. Results which cannot be quantified (i.e., a "less than" NOEC value) are not acceptable, and a retest will have to be performed. A retest of a non-acceptable test must be performed during the same compliance period as the test it is replacing. Express the test NOEC as TU_c (Chronic Toxic Units), by dividing 100/NOEC for DMR reporting. Report the LC₅₀ at 48 hours and the IC₂₅ with the NOEC's in the test report.

- b. The test dilutions should be able to determine compliance with the following endpoint(s):

Outfall 001

Chronic NOEC ≥ 17%, equivalent to a TU_c ≤ 5.88

- c. The permittee may provide additional samples to address data variability. These data shall be reported and may be included in the evaluation of effluent toxicity. Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3.

- d. The test data will be evaluated for reasonable potential at the conclusion of the test period. The data may be evaluated sooner if requested by the permittee, or if toxicity has been noted. Should evaluation of the data indicate that a limit is needed, a WET limit and compliance schedule will be required and the toxicity tests of Part I.E.1.a. may be discontinued.

- e. The permit may be modified or revoked and reissued to include pollutant specific limits in lieu of a WET limit should it be demonstrated that toxicity is due to specific parameters. The pollutant specific limits must control the toxicity of the effluent.

2. Reporting Schedule

The permittee shall submit the toxicity test reports with the DMR for the tests specified in accordance with the following schedule:

<u>Period</u>	<u>Compliance Date</u>	<u>Submittal Date</u>
Annual 1	By 12/31/2010	By 01/10/2011
Annual 2	By 12/31/2011	By 01/10/2012
Annual 3	By 12/31/2012	By 01/10/2013
Annual 4	By 12/31/2013	By 01/10/2014
Annual 5	By 12/31/2014	By 01/10/2015

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)														
To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC ₅₀ , since the ACR divides the LC ₅₀ by the NOEC. LC ₅₀ 's >100% should not be used.														
Table 1. ACR using Vertebrate data														
Set #	LC ₅₀	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use							
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
ACR for vertebrate data:														
0														
Table 1. Result: Vertebrate ACR 0														
Table 2. Result: Invertebrate ACR 0														
Table 2. Result: Lowest ACR Default to 10														
Table 2. ACR using Invertebrate data														
Set #	LC ₅₀	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use							
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
ACR for vertebrate data:														
0														
DILUTION SERIES TO RECOMMEND														
Table 4.														
Monitoring % Effluent														
Limit % Effluent														
Dilution series based on data mean 40.6 2.4656681														
Dilution series to use for limit 17 5.8823529														
Dilution factor to recommend: 0.6368435 0.4123106														
Dilution series to recommend: 100.0 1.00 100.0 1.00														
63.7 1.57 41.2 2.43														
40.6 2.47 17.0 5.88														
25.8 3.87 7.0 14.27														
16.45 6.08 2.9 34.60														
Extra dilutions if needed 10.48 9.55 1.2 83.92														
6.67 14.99 0.5 203.54														

Cell: I9

Comment:

This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18

Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22

Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40

Comment:

If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41

Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48

Comment:

See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62

Comment:

Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62

Comment:

Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117

Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119

Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121

Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: $100/\text{NOEC} = \text{TUc}$ or $100/\text{LC50} = \text{TUa}$.

Cell: C138

Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Fact Sheet
Proctors Creek WWTP

Attachment J

Reduced Monitoring Evaluation

Evaluation of Proctors Creek WWTP Compliance History

DMR Date	NH ₃			TSS			cBOD ₅			TP		
	Mo. Avg mg/L	Limit mg/L	Mo Avg/Limit Ratio	Mo. Avg mg/L	Limit mg/L	Mo Avg/Limit Ratio	Mo. Avg mg/L	Limit mg/L	Mo Avg/Limit Ratio	Mo. Avg mg/L	Limit mg/L	Mo Avg/Limit Ratio
10-Feb-07	<0.1	6.2	0.0	2.7	7.1	38.0	<QL	7.1	0.0	1.1	2.0	55
10-Mar-07	0.4	6.2	6.5	3.2	7.1	45.1	<QL	7.1	0.0	1.4	2.0	70
10-Apr-07	0.1	6.2	1.6	4.4	7.1	62.0	<QL	7.1	0.0	0.5	2.0	25
10-May-07	1.97	6.2	31.8	18.5	7.1	260.6	0.5	7.1	7.0	1.17	2.0	58.5
10-Jun-07	0.77	6.2	12.4	2.1	7.1	29.6	<QL	7.1	0.0	1.08	2.0	54
10-Jul-07	0.29	4.2	6.9	2.5	10.7	23.4	<QL	10.7	0.0	1.19	2.0	59.5
10-Aug-07	0	4.2	0.0	2	10.7	18.7	<QL	10.7	0.0	1.74	2.0	87
10-Sep-07	0.48	4.2	11.4	2.7	10.7	25.2	<QL	10.7	0.0	1.52	2.0	76
10-Oct-07	0.61	4.2	14.5	2.1	10.7	19.6	<QL	10.7	0.0	0.99	2.0	49.5
10-Nov-07	0.3	4.2	7.1	2.7	10.7	25.2	<QL	10.7	0.0	1.62	2.0	81
10-Dec-07	0.54	6.2	8.7	3.6	7.1	50.7	<QL	7.1	0.0	1.1	2.0	55
10-Jan-08	1.9	6.2	30.6	4.6	7.1	64.8	<QL	7.1	0.0	0.38	2.0	19
10-Feb-08	4.38	6.2	70.6	4.5	7.1	63.4	<QL	7.1	0.0	0.78	2.0	39
10-Mar-08	2.19	6.2	35.3	2.5	7.1	35.2	<QL	7.1	0.0	1.26	2.0	63
10-Apr-08	0.26	6.2	4.2	2.2	7.1	31.0	<QL	7.1	0.0	1.3	2.0	65
10-May-08	0.17	6.2	2.7	9.6	7.1	135.2	0.7	7.1	9.9	0.72	2.0	36
10-Jun-08	<QL	6.2	0.0	4.3	7.1	60.6	<QL	7.1	0.0	0.54	2.0	27
10-Jul-08	0.26	4.2	6.2	2.3	10.7	21.5	<QL	10.7	0.0	1.06	2.0	53
10-Aug-08	0.07	4.2	1.7	1.9	10.7	17.8	<QL	10.7	0.0	1.78	2.0	89
10-Sep-08	<QL	4.2	0.0	1.4	10.7	13.1	<QL	10.7	0.0	1.77	2.0	88.5
10-Oct-08	0.06	4.2	1.4	1.8	10.7	16.8	<QL	10.7	0.0	1.21	2.0	60.5
10-Nov-08	<QL	4.2	0.0	2.8	10.7	26.2	<QL	10.7	0.0	1.58	2.0	79
10-Dec-08	0.1	6.2	1.6	2.7	7.1	38.0	<QL	7.1	0.0	1.24	2.0	62
10-Jan-09	0.25	6.2	4.0	7.5	7.1	105.6	<QL	7.1	0.0	1.36	2.0	68
10-Feb-09	0.52	6.2	8.4	5.7	7.1	80.3	1.2	7.1	16.9	1.33	2.0	66.5
10-Mar-09	1.14	6.2	18.4	5.3	7.1	74.6	<QL	7.1	0.0	1.39	2.0	69.5
10-Apr-09	1.04	6.2	16.8	6.6	7.1	93.0	0.78	7.1	11.0	1.29	2.0	64.5
10-May-09	0.54	6.2	8.7	17.1	7.1	240.8	2.1	7.1	29.6	1.22	2.0	61
10-Jun-09	<QL	6.2	0.0	5.3	7.1	74.6	0.9	7.1	12.7	0.88	2.0	44
10-Jul-09	0.03	4.2	0.7	3	10.7	28.0	<QL	10.7	0.0	1.18	2.0	59
10-Aug-09	<QL	4.2	0.0	1.2	10.7	11.2	<QL	10.7	0.0	1.9	2.0	95
10-Sep-09	0.02	4.2	0.5	1.6	10.7	15.0	<QL	10.7	0.0	1.32	2.0	66
10-Oct-09	<QL	4.2	0.0	0.1	10.7	0.9	<QL	10.7	0.0	1.45	2.0	72.5
10-Nov-09	<QL	4.2	0.0	0.2	10.7	1.9	<QL	10.7	0.0	1.54	2.0	77
10-Dec-09	<QL	6.2	0.0	0.8	7.1	11.3	<QL	7.1	0.0	1.22	2.0	61
10-Jan-10	0.21	6.2	3.4	1.2	7.1	16.9	<QL	7.1	0.0	1.21	2.0	60.5

Average Ratio

10.7

52.3

1.4

59.4

Baseline Monitoring Frequency*

5-7 Days/Week

5-7 Days/Week

1/Week

Current Monitoring Frequency

1/ Week

1/ Week

1/ Week

Proposed Monitoring Frequency

1/ Week

1/ Week

1/ Week

*Per the January 6, 2010 permit manual

** Based on Water Permit Managers June 2003 meeting minutes

Evaluation of Falling Creek WWTP Compliance History

DMR Date	pH Min S.U.	pH Max S.U.	Data within 0.5 units of permit limit?	Minimum DO mg/L	Data within 0.5 mg/L of permit limit?
10-Feb-07	6.8	7.9	No	8.9	No
10-Mar-07	7	7.9	No	9.3	No
10-Apr-07	7.1	7.9	No	9.5	No
10-May-07	7	7.9	No	8.6	No
10-Jun-07	6.9	7.9	No	8.1	No
10-Jul-07	7	7.8	No	7.8	No
10-Aug-07	6.8	7.9	No	7.5	No
10-Sep-07	7.1	7.9	No	7.7	No
10-Oct-07	7	8	No	8.1	No
10-Nov-07	6.8	7.8	No	6.7	No
10-Dec-07	6.8	7.7	No	7.2	No
10-Jan-08	6.8	7.8	No	9.1	No
10-Feb-08	6.9	7.8	No	9.2	No
10-Mar-08	6.8	7.7	No	6.9	No
10-Apr-08	6.7	7.6	No	9.2	No
10-May-08	6.3	7.8	Yes - min	9	No
10-Jun-08	6.8	7.6	No	8.6	No
10-Jul-08	6.8	7.8	No	7.8	No
10-Aug-08	6.4	7.8	Yes - min	7.8	No
10-Sep-08	6.9	7.9	No	7.6	No
10-Oct-08	7	7.8	No	7.9	No
10-Nov-08	6.9	7.8	No	8.3	No
10-Dec-08	6.4	7.6	Yes - min	8.8	No
10-Jan-09	6.5	7.9	Yes - min	9.4	No
10-Feb-09	6.3	7.5	Yes - min	9.3	No
10-Mar-09	5.9	8.1	Yes - min	9.8	No
10-Apr-09	6.2	7.3	Yes - min	9.5	No
10-May-09	6.4	7.3	Yes - min	9.1	No
10-Jun-09	6.4	7.4	Yes - min	8.5	No
10-Jul-09	6.4	7	Yes - min	8.1	No
10-Aug-09	6.5	7.4	Yes - min	8	No
10-Sep-09	6.6	7.3	No	7.7	No
10-Oct-09	6.8	7.4	No	8.2	No
10-Nov-09	6.5	7.3	Yes - min	8.4	No
10-Dec-09	6.4	7.4	Yes - min	9.1	No
10-Jan-10	6.3	7.3	Yes - min	9.3	No

Average Ratio

N/A

* See below

Current Monitoring Frequency

1/ Day

1/ Day

Proposed 2008-2012 Monitoring Frequency

1/ Day

4/Week

* 1-(DO avg - DO Limit)/ DO Limit * 100%

(1-(8.44-6.0)/6.0)100% = 59.3%

Fact Sheet
Proctors Creek WWTP

Attachment K

Permittee Comments on Draft Permit and DEQ Response



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

PIEDMONT REGIONAL OFFICE

4949A Cox Road, Glen Allen, Virginia 23060
(804) 527-5020 Fax (804) 527-5106
www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

Michael P. Murphy
Regional Director

July 16, 2010

Roy E. Covington, P.E.
Chesterfield County, Director of Public Utilities
PO Box 608
Chesterfield, VA 23832-0009

via email: rcovington@chesterfield.gov

RE: Reissuance of VPDES Permit No. VA0060194 for Proctor's Creek WWTP

Dear Mr. Covington:

DEQ has received the County's comments on the draft permit package and offers the following responses.

Item 1: Public Notice Biosolids Disposal Description
DEQ is amenable to the proposed revision.

Item 2: TRC Effluent Monitoring Frequency
The County proposed changing the 1/(2 hours) sampling frequency to 12/day and stated that the sampling occurs every 2 hours 15 minutes. DEQ will revise the Part I.A sampling frequency to 12/day, as requested, and add a footnote to the sampling frequency requiring the samples with a minimum separation time of ninety minutes and a maximum separation time of 150 minutes. As long as 12 daily samples meet the time separation requirements, the facility should not be penalized for taking additional samples that do not meet the separation times.

Item 3: Chlorine Contact Tank
Part I.B.1.a-c will be revised as requested (i.e. to read "the chlorine contact tank system"). To clarify the sampling requirements, Part I.B.1.a will be revised to read: The permittee shall monitor the TRC at the outlet of the chlorine contact tank system every two hours by grab sample. The samples shall not include flow contributions from non-chlorinated wastewaters.

Item 4: Testing Allowance to Demonstrate Adequate Chlorine Kill
The County requested that the 126 N/100 mL values in Part I.B.1.c be revised to 235 N/100 mL to reflect the instantaneous maximum water quality standard. The 2010 revisions to the water quality standard regulations removed the 235 N/100 mL instantaneous maximum criterion; the 235 value is now only used in assessing the ambient stream's health when there is insufficient data to evaluate the stream based on the water quality standard of 126 N/100 mL as a geometric mean (i.e. the 235 N/100 mL is no longer a water quality standard but rather an assessment criterion). This permit special condition remains as drafted.

Item 5: Sampling Location for SIUs

The County requested that the last sentence of Part I.D.5.a be removed to allow the pretreatment facilities the option to sample at either the end of the industrial process or at the “end-of-pipe” (i.e. the combined waste streams). DEQ supports the County’s position and will revise the last sentence from being an “and” clause to an “or” clause, thus allowing the requested flexibility in sampling location.

Item 6: 90 Day Notification Requirement Regarding Changes in Discharging Status

DEQ will revise Part I.D.5.c as requested to remove the “90 day” clause.

Item 7: SIU Surveys

Currently, DEQ does not have the protocol used by the County to perform the required SIU surveys. The intent of this special condition is to ensure that DEQ is aware of and approves the survey methodology. Once the protocol is approved, DEQ will not require resubmittal of this information in subsequent permit renewals but rather will ask that the permittee to review the methodology and notify the Agency as to any changes. DEQ intends for this special condition to be similar to the Operation and Maintenance (O&M) Manual updates and requirements, found in Part I.C.2

Item 8: 30 Day Completion of Pretreatment Inspection Reports

DEQ believes that inspection reports should act as a “snapshot” in time and reflect the conditions at the time of the inspections. Responses to action items are not reflective of the observations made on the day of the inspection. If requested items are not available during the inspection, those items should be documented in the final inspection report; finalized reports should not be delayed awaiting responses to action items. Additionally, Part I.D.12, as drafted, allows the permittee to request an extension to the 30 day requirement, if necessary. This special condition will remain as drafted.

This letter is intended to provide information on the conditions that DEQ intends to include in your draft permit reissuance that will proceed to public notice on July 28, 2010. If you would like to discuss the information contained in this letter or participate in a meeting to discuss your concerns, please contact me at 804/527-5048 or via email at vekelly@deq.virginia.gov.

Sincerely,
[via email]

Virginia R. E. Kelly, P.E.

Cc: George Hayes
 Scott Smedley



Chesterfield County, Virginia Utilities Department

9840 Government Center Parkway – P.O. Box 608 – Chesterfield, VA 23832-0009
Phone: (804) 748-1291 – Fax: (804) 751-4607 – Internet: chesterfield.gov

ROY E. COVINGTON
Director

July 1, 2010

Piedmont Regional Office
JUL 02 2010
RECEIVED

Mrs. Virginia R. Kelly
Piedmont Regional Office
Department of Environmental Quality
4949-A Cox Road
Glen Allen, VA 23060-6295

Dear Mrs. Kelly,

Thank you for the opportunity to comment on the draft permit for Proctors Creek WWTP. I respectfully request the following changes to the public notice and draft permit.

1. Public Notice Project Description – Please change: “The sludge will be disposed by land application” to “The Biosolids from the treatment process will be land applied.....”.
2. Part I, page 1 & 3 A. – Please change the TRC monitoring from 1/(2hours) to 12/day. While the operational rounds are conducted every 2 hours it would be extremely difficult for the operators to perform the TRC testing exactly every 2 hours. The TRC test is performed every 2 hours +/- 15 minutes.
3. Part I, page 6 B.1. a.b.c. – Please change “of each operating chlorine contact tank” to “the chlorine contact tank system”. The chlorine disinfection system has one sodium hypochlorite feed point before all the contact cells. The TRC is then measured at the end of contact tank system before dechlorination.
4. Part I, page 6 B.1.c. – Please change 126 N/100ml to 235 N/100ml. It is our understanding that the instantaneous limit for *E. coli* should be less than 235 N/100mL and the monthly geometric mean should be less than 126 N/100ml.
5. Part I, page 12 D.5.a. Please remove the last sentence, since categorical SIU's can either be sampled at the end of the categorical process or if a combined waste stream formula is developed they can be sampled at the end of pipe.

July 1, 2010
Mrs. Virginia R. Kelly
Piedmont Regional Office
Department of Environmental Quality
Draft Permit for Proctors Creek WWTP

6. Part I, page 12 D.5.c. Please remove the 90 days requirement in "additionally, the modified permit shall include a requirement to notify the Control Authority 90 days prior to reverting from no discharge status to discharging status". Current zero discharge permittees have the requirement placed in the permit that states that if they wish to discharge they need to notify the County, sample and analyze and get the results approved before discharging.
7. Part I, page 13 D.11. Please modify to "Within 180 days of the effective date of this permit, reevaluate the adequacy of the current procedure for the ongoing survey of all the Significant Industrial Users discharging to the POTW. If there is a need for procedure modification, submit the procedure modification to DEQ prior to implementation."
8. Part I, page 13 D.12. Please remove this provision, as action items sometimes take more than 30 days to complete. We will forward the inspection report to DEQ once they are completed.

If you have any questions on the items above please feel free to contact me at (804) 748-1416 or Scott Smedley at (804) 768-7557. Thank you.

Sincerely,



Roy E. Covington, P.E.
Director of Utilities

cc George Hayes, Assistant Director of Utilities
Scott Smedley, Plant Manager, Wastewater Treatment Plants
Abha Sharma, Engineering Supervisor, Industrial Pretreatment